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HOW THE PATHOLOGY OF FIBROID TUMORS OF THE UTERUS WILL DETERMINE THE SELECTION OF RADIIUM OR OPERATION IN THEIR TREATMENT*

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ABDOMINAL surgery has become so perfected, the technic of hysterectomy and myomectomy so thoroughly mastered, and the employment of radium and x-ray so widespread, that there is hardly a fibroid tumor found at examination which has not been treated, or has not had an operation advised. Yet in the light of clinical experience this advice is not justified; furthermore, the practitioner has become confused in his consideration of fibroids, their life history, their dangers, the interpretation of their symptoms, and the indications and contraindications for their treatment.

It is my purpose this evening to attempt to correlate the accepted clinical facts relative to uterine myomas:

(a) To demonstrate how they develop and grow, as well as how they live; (b) what allied conditions change the rate of their growth; (c) how and why they produce symptoms; (d) what pathologic changes these tumors may undergo; and set forth some of their dangers and complications; (e) their influence on pregnancy and labor, and finally, to describe the types of tumor amenable to treatment by radium or x-ray, the types that require surgery, as well as the form of growth which will require no treatment at all.

The fibroid tumor is the most common form of uterine neoplasm; while histologically it is benign, it possesses great potentiality for harm. Its origin is uncertain, though it is probable that fibroids develop from congenital rests, or fetal misplacements of fibrous tissue in or about the wall of the blood vessels which course within the uterine muscle. When first recognized, these congenital rests appear as solid growths which seem to be due to a proliferation of the muscular and connective tissue

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elements in the myometrium around the different rest centers. They are usually found in the uterine body as small nodules in, but not of the muscle, incapsulated and discrete. Fibroids are usually multiple, not

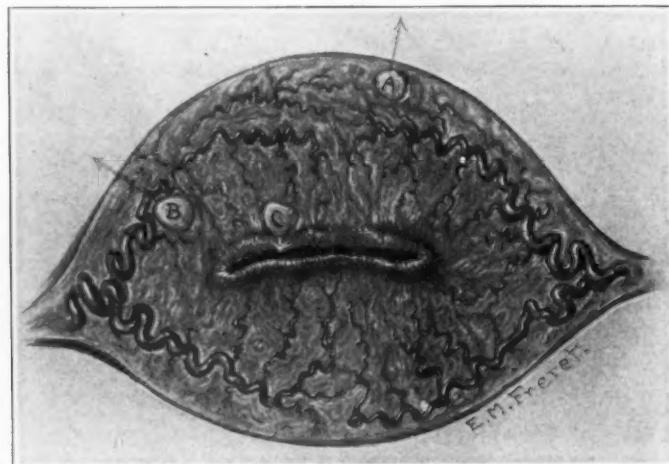


Fig. 1.—Transverse section of uterus, showing the accurate arteries and intermuscular branches, with three intramural fibroid rests having different relations to the myometrium and uterine circulation.

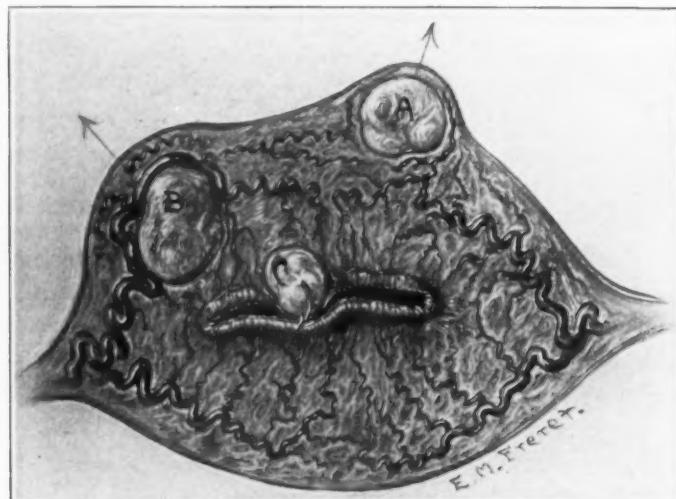


Fig. 2.—Tumor A is being evolved outward by muscular contraction becoming a subserous growth; its circulation is on the proximal side. Tumor B is developing within the uterine wall as an intramural tumor, amply supplied with blood. Tumor C is being evolved into the uterine cavity, carrying the endometrium before it, producing atrophy of the overlying mucosa.

more than 1 or 2 per cent occur singly, and their development is limited almost wholly to the period of sexual activity.

From 5 to 10 per cent of all women over thirty have these tumors; and it has been stated that a fibroid or fibroids may be found in 40 per cent of women who have reached the age of fifty.

Clinically, it has been observed that the hyperpituitary type of woman, who has an anteverted-anteflexed uterus with a relatively large uterine body from the very beginning of her menstrual life, is rather prone to develop fibroids. These patients always flow freely; they may have co-menstrual dysmenorrhea, and are frequently sterile.

Fortunately, few of these tumors produce symptoms, and few attain large size, but all grow under the influence of repeated menstruation, or the stimulation of pregnancy *and all fibroid tumors bear watching.*

To appreciate their growth and development we must review certain physiologic facts. First, their relation to the uterine blood supply. Fibroid tumors begin as intramural growths, usually in the body of the uterus, with a definite relation to the uterine circulation; the mass of the

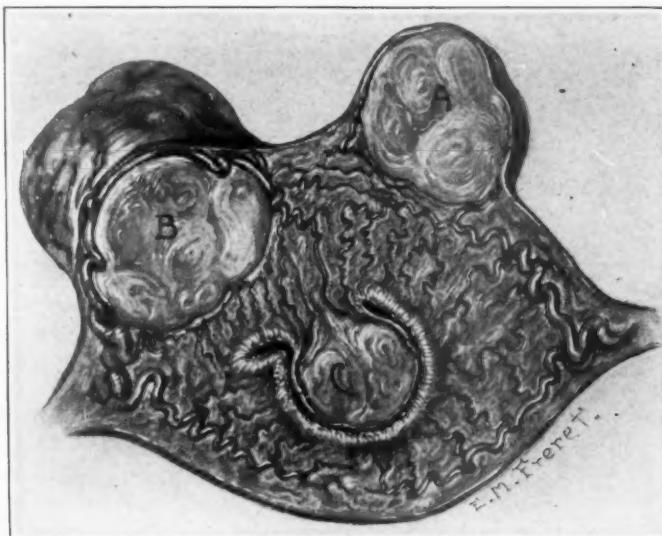


Fig. 3.—In this drawing all of the tumors have grown and have been evolved in the direction of least resistance by uterine contraction, carrying their capsules with them. C is becoming pedunculated, has thinned its overlying endometrium, distorted the cavity, and increased the area of endometrial response.

arterial and venous blood supply is found in the outer third of the uterine wall and, as the pelvic vessels have no valves the blood is propelled through them by uterine contraction. Another fact worthy of mention is that the basal endometrium and the inner third of the uterine wall have a relatively poor blood supply, for the uterine arteries and veins, ascending toward the fundus on the lateral walls of the uterus, give off the arcuate vessels which course anteriorly and posteriorly in the outer third of the uterine myometrium (Fig. 1), and these in turn break into the intermuscular branches which reach the basal endometrium as arterioles and actually terminate in the venous radicals from which the venous return begins. The paucity of the endometrial circulation is a factor in the terminal necrosis which takes place in the

atrophic endometrium covering submucous and polypoid growths. Fig. 1 shows three fibroid nodules all in an intramural position, in different relations to the circulation and with varying amounts of uterine muscle surrounding them. Each nodule will have a different rate of growth, a different life history and produce a train of symptoms dependent upon its final location and the paucity or abundance of its blood supply.

The second physiologic fact which determines the life and development of a fibroid tumor is the constant intermittent contraction of the uterus, for by these muscular contractions the tumor mass is evolved in the direction of least resistance, carrying its capsule and its circulation with it. In Fig. 2 we can see one intramural tumor being evolved outward, becoming a subperitoneal growth, and pushing its blood supply ahead of it, owing to the fact that the great mass of the uterine muscle is on the proximal side of this tumor. In the same picture we find

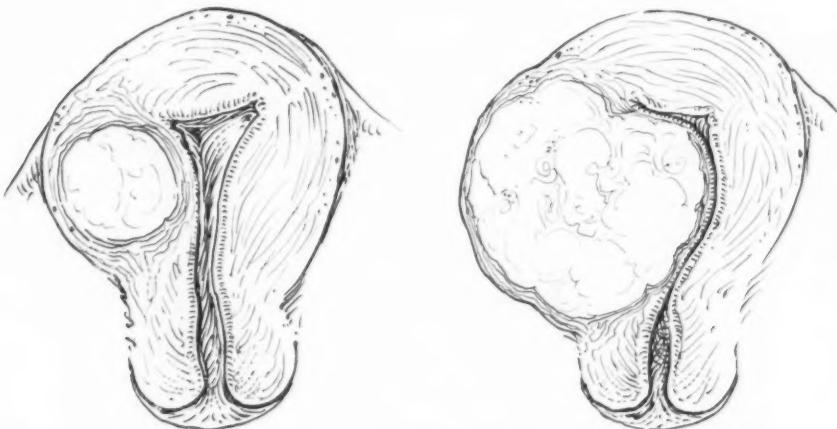


Fig. 4.—Type of interstitial growth enlarging the uterus, increasing the menstrual bleeding by increased endometrial area, lengthening and distorting the cavity. This type is best suited to radium or x-ray therapy.

another growth being evolved toward the uterine cavity, and as it is extruded the overlying endometrium becomes stretched, thin, and atrophic; the endometrial glands and blood vessels become flattened and compressed, many of the glands lying parallel to the free surface of the tumor, or they may have entirely disappeared, while the venous radicals are blocked by tumor pressure and thus enlarge, forming venous lacunae, which, as the pressure increases rupture and produce metrorrhagia. *Only the intramural growth which is surrounded on all sides by an equal amount of uterine muscle grows slowly and remains within the confines of the uterine wall.* It is this type of tumor which atrophies at the menopause. All other growths are evolved in the direction of least resistance.

Repeated menstruation, pelvic inflammation, and pregnancy, all seem to have an influence on the rapidity with which the growth develops.

This is particularly evident in patients who miscarry, or in whom involution is arrested or tardy.

Fibroids are benign growths and do not always impair a woman's health. They may not produce symptoms, but when fibroids cause symptoms, they may be grouped into (1) those that are *suggestive* and (2) those that are *characteristic*.

The suggestive symptoms include:

- a. *Menstrual excesses and irregularities* evidenced by menorrhagia and metrorrhagia with their secondary cardiovascular effects, i.e., anemia, increase in pulse rate, palpitation, dyspnea, hemic murmurs, etc.
- b. *Abdominal enlargement due to the growing tumor mass.*
- c. *Dysmenorrhea* which usually appears in the form of comenstrual pain.
- d. *Sterility and abortion.*

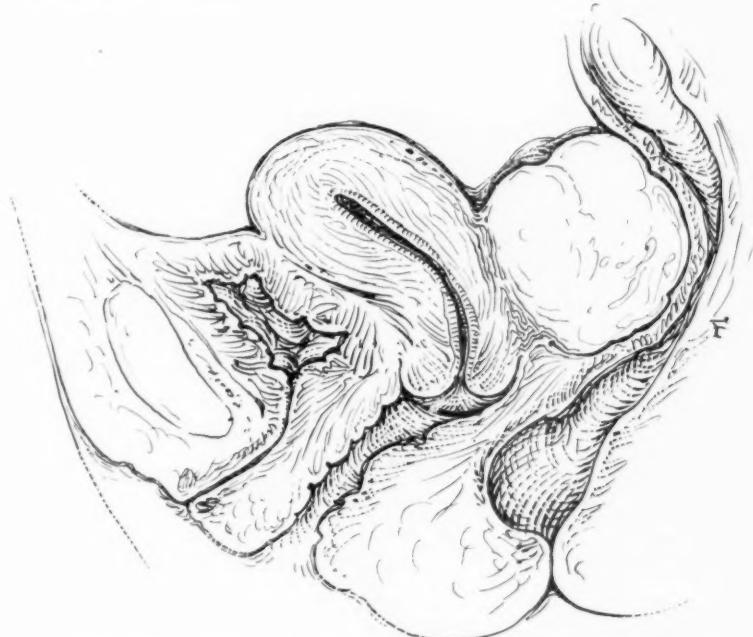


Fig. 5.—Subperitoneal growth with no bleeding, making pressure upon rectum, interfering with the hemorrhoidal veins, not amenable to radium treatment.

- e. *Pressure effects*, as evidenced by urinary frequency, dysuria, difficult defecation, hemorrhoids, unilateral sciatic pain, edema, or varicosities.
- f. *Leucorrhea*—the increased blood supply necessary for the development of the growth produces a venous stasis in the unsupported cervix, which in turn results in a hypersecretion of mucus from the cervical glands.
- g. *Digestive disturbances* which are due to three causes; the secondary anemia, the pressure on the rectum and colon and the presence of intestinal adhesions.

Menstrual hemorrhage is common in interstitial and sessile submucous growths which increase the area of endometrial response, while intermenstrual bleeding is always suggestive of pedunculated submucous tumors. The bleeding is not from the tumor but from the atrophic endo-

metrium stretched over it, or from the hypertrophic endometrium opposite, or from the congestion of the endometrium in the angle below it (Fig. 10). Any tumor which is extruded toward the uterine cavity and grows into it, increases the area of endometrial surface, blocks the venous return and must produce by pressure a venous hyperemia which will result in a diapedesis and rhesis. Metrorrhagia is always a result of tissue necrosis, areas of which occur in the overstretched atrophic endometrium.

Comenstrual pain is common in interstitial and submucous growths even before the tumor assumes great size. Many of our most intractable cases of dysmenorrhea are due to studding of the uterine muscle with tumors of less than 1 or 2 em. in diameter. On the other hand, there



Fig. 6.—Subserous tumor—with no bleeding—producing dysuria. Not suitable for radium or x-ray treatment.

may be no pain at all in large subserous growths until their circulation is interfered with by torsion, displacement, or the formation of adhesions.

Pressure effects result from tumor growth with pressure upon the bladder, ureters, rectum, pelvic veins, and nerves, hence, pressure may produce symptoms referable to the urinary tract; as frequency, dysuria, hydroureter, and hydronephrosis, while pressure on the rectum or pelvic colon may result in intestinal flatulence, constipation, proctitis or hemorrhoids; likewise, tumors incarcerated in the culdesac or in the lateral fornices may produce varicosities of one or both extremities, or unilateral edema or sciatica. Interference with the bowel function by tumor pressure or by intestinal adhesions is perhaps the commonest cause of digestive disturbances.

The characteristic signs of fibroid tumors are always apparent on physical examination. If the growth has risen out of the pelvis it presents as a smooth, hard, nodular, insensitive tumor mass, which is sharply defined, in the hypogastrium, or in one or the other lower

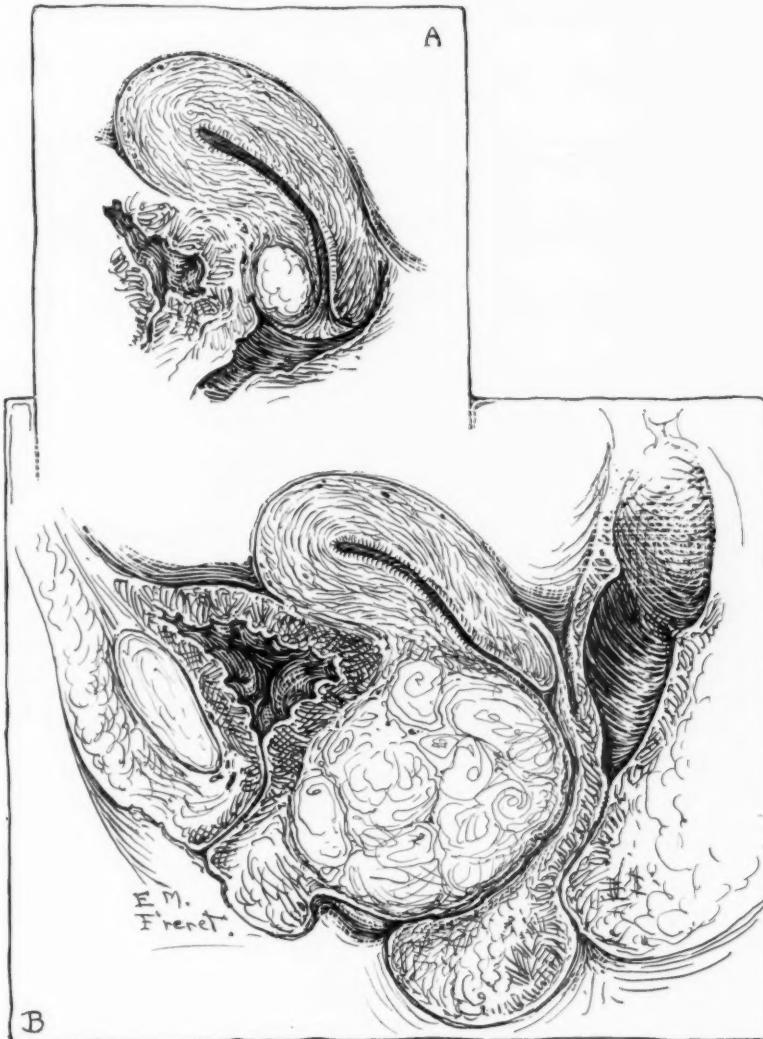


Fig. 7.—Large cervical myoma—occluding the vaginal lumen—producing no symptoms until marriage. Requires operation.

quadrants of the abdomen. The upward or lateral excursion is limited unless the tumor is pedunculated. Bimanual examination reveals a mass connected with the uterus, asymmetrically enlarging it and inseparable from it; smooth, hard, nodular and sharply defined and usually insensitive, unless it is undergoing inflammatory or circulatory changes.

On passing a sound into the uterine cavity, the canal is almost always elongated and is frequently distorted.

Cervical, subvesical, and intraligamentous growths change the position of the cervix and are apt to displace the uterus upward or to one side (Figs. 6, 7). A uterine bruit is present in two-thirds of all myomas which attain a size sufficient to lift themselves out of the true pelvis, for lateral rotary torsion is relatively common. Pedunculated submucous tumors not only increase the size and change the symmetry of the

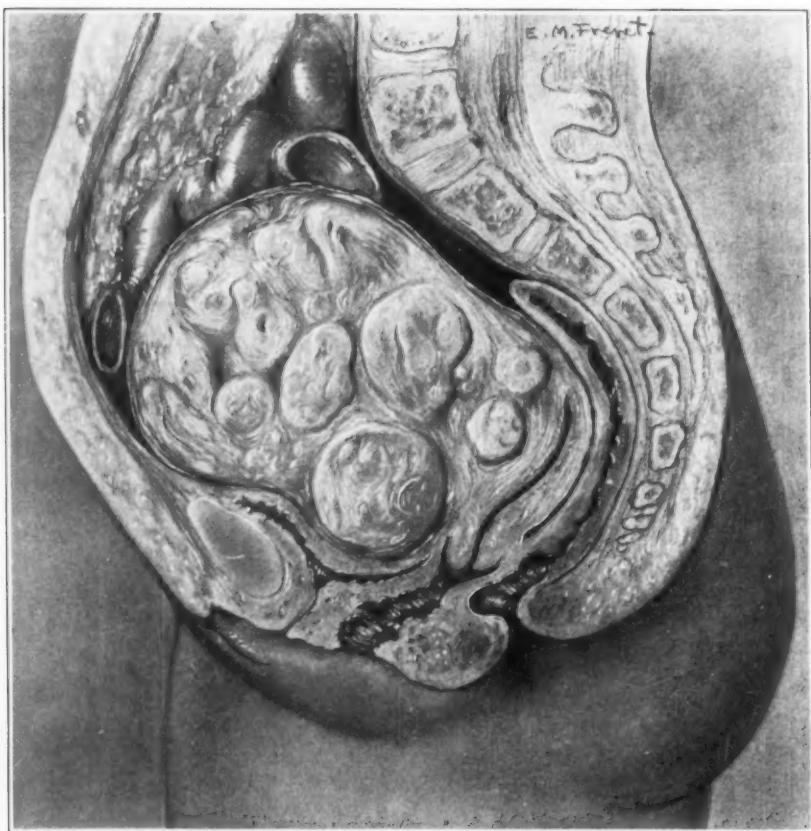


Fig. 8.—Large multiple myoma, not in relation to the uterine cavity. Urinary frequency the *only symptom*. Requires operation.

uterus, but stimulate uterine contraction which in time attempts to extrude the mass from the uterus and to dilate the cervix; hence, digital examination may reveal effacement of the lower uterine segment or protrusion of a smooth tumor mass into the cervical canal. As a confirmatory sign, the outline of the tumor and its relation to the uterus may be demonstrated by the fluoroscope after injecting oxygen into the peritoneal cavity, thus producing a pneumoperitoneum. However, routine fluoroscopy is not necessary in order to make the diagnosis.

All fibroid tumors are subject to pathologic change, these changes are *primarily circulatory* and result from the partial or complete cutting off of the afferent or obstruction to the efferent blood supply. It is apparent, therefore, that pregnancy must play an important rôle in the production of these changes, owing to the disparity between the size of myoma and their blood supply; atrophy, hyaline changes, and necrobiosis are of common occurrence. Edema is perhaps the most common circulatory change which occurs in a fibroid tumor. Edema of the tumor is present during menstruation and during pregnancy, for, under the influence of the latter all fibroids grow, and when the uterus is emptied and retraction and contraction take place, the efferent blood

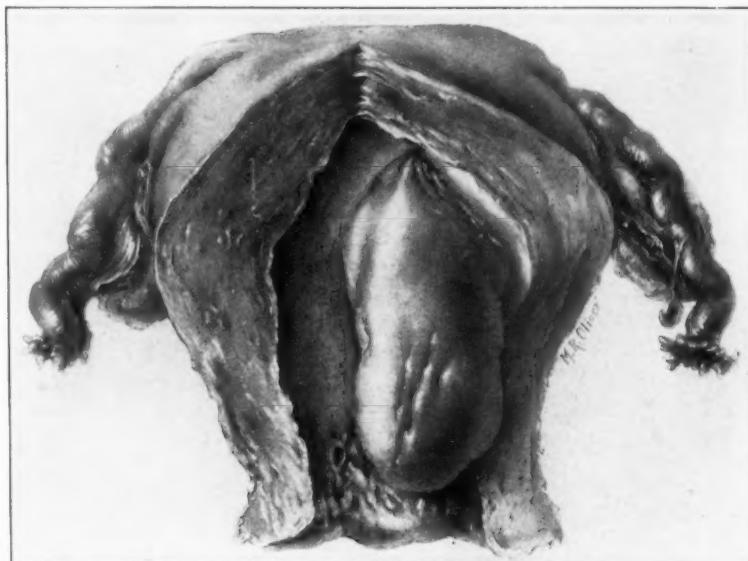


Fig. 9.—Pedunculated fibroid with terminal necrosis producing metrorrhagia. Radium or x-ray will increase the necrosis.

supply is obstructed and the tumor necessarily becomes edematous. Edema is an early stage of necrosis and it is the associated hyaline changes which are the origin of many of the fibrocytic areas found in these tumors. Hyaline degeneration is the first change to take place in a myoma, as a result of malnutrition. As it progresses liquefaction occurs and the tumor may become more and more cystic.

Necrobiosis may be described as partial death of the tissues in contradistinction to necrosis or total death, and it appears as red degeneration. Many of these tumors recover their lost vitality while others go on to necrosis. Myomas in a state of red degeneration are of comparatively soft consistency. The tumor enlarges rapidly, becomes sensitive and is associated with local pain, a slight elevation of temperature and a mod-

erate leucocytosis. Calcification and cystic degeneration are changes more usually found in subserous tumors.

Septic infection and necrosis from torsion may occur in both submucous and subserous growths. Every fibroid should be serially sectioned, for the incidence of sarcoma and carcinoma is sufficiently large to seriously effect the prognosis.

Fibroid tumors complicate pregnancy and labor. They may also cause

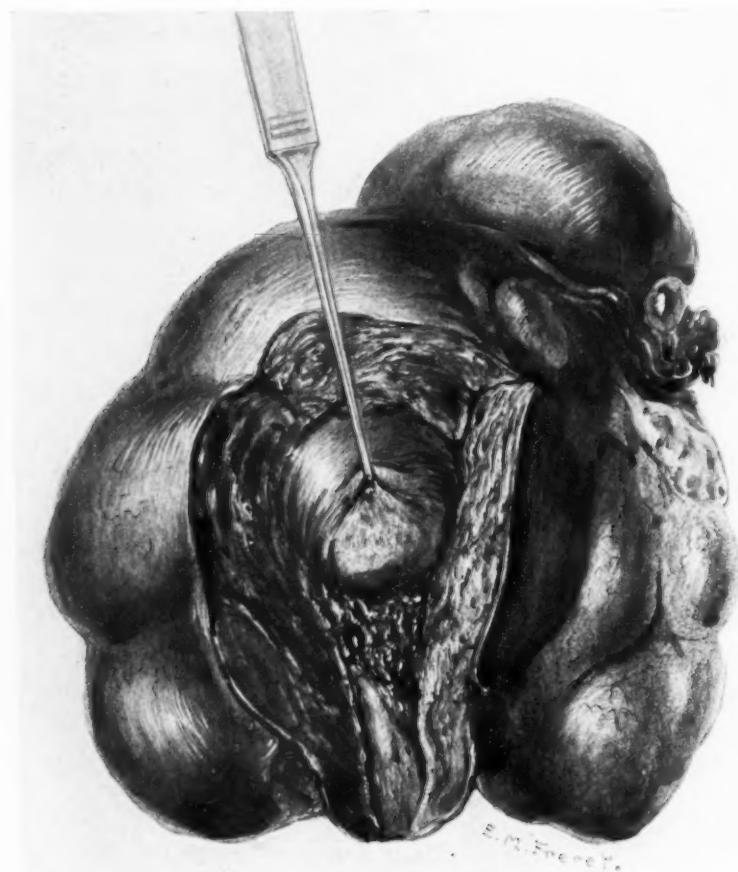


Fig. 10.—Multinodular tumor, showing all types of myoma, with atrophy and hypertrophy of the endometrium.

sterility, and if the patient does conceive, favor the occurrence of abortion; or they may grow to such a size during pregnancy as to embarrass the cardiac and respiratory functions of the woman.

Torsion and red degeneration are relatively common complications during pregnancy. While a pedunculated tumor may be removed without disturbance of the pregnancy, myomectomy on interstitial growths should never be considered. The majority of tumors do not interfere

with labor except by producing malposition of the fetus, because they are lifted out of the pelvis in the course of uterine contractions and during dilatation. Only cervical growths incarcerated in the pelvis obstruct labor. It is wise, therefore, to let the woman with a fibroid tumor have a test of labor under intelligent supervision, for many deliver spontaneously. When labor is obstructed, section and hysterectomy are the procedures of choice.

Treatment.—Many fibroids need no treatment, for they produce no symptoms and do not grow for long periods of time. But all women who are the subjects of fibroid tumors should be under observation, reporting for examination at definite intervals. Fibroids demand treatment for the (1) control of hemorrhage, (2) relief of pressure, and (3)



Fig. 11.—Submucous tumor having undergone cystic degeneration—producing exhausting hemorrhage not controlled by radium. Consistency of tumor suggestive of pregnancy without any other signs. Operated.

rapid or progressive growth, torsion, and degenerative changes. Bleeding may always be controlled by rest, packing, x-ray, and radium. Drugs have little effect. The currette, aside from its diagnostic value, has no place in the treatment of hemorrhage caused by a fibroid. Radium may be used for the control of hemorrhage in tumors, *within the confines of the uterus*, if the tumor is not larger than a three months' pregnancy, and is without adnexal growth or parametrial or peritoneal lesions.

Before subjecting any woman to x-ray or radium therapy, she should be examined under anesthesia to determine the exact relation and location of the tumor mass or masses, and a diagnostic curettage should be

made to exclude malignancy. All scrapings should be submitted to a pathologist.

The following types of tumor demand operation:

1. Tumors larger than a three months' pregnancy.
2. Rapidly growing tumors which suggest progressive changes.
3. Tumors producing pressure symptoms.
4. Tumors associated with pelvic pain.
5. Pedunculated tumors, in which radium only increases the neerosis.
6. Tumors with adnexal pathology.
7. Tumors with associated secondary anemia (cachectic appearance) in which the uterine hemorrhage has not been sufficient to account for the degree of anemia.
8. Tumors in young women.
9. Multiple submucous tumors distorting the uterine cavity (radium in these cases is likely to produce pyometra), and finally, in cases where the tumor mass cannot be definitely differentiated, and in women who fear radium.

All of these cases require either myomectomy or hysterectomy.

20 LIVINGSTON STREET.

POSTMORTEM FINDINGS IN TEN CASES OF TOXEMIA OF PREGNANCY

BY J. WARREN BELL, M.D., PH.D., EVERETT, WASH.

IPURPOSE in this paper to present data obtained from study of material at my disposal, emphasizing the widespread nature of the condition by a comparison of lesions in various organs, with special attention to the appearance of the liver lesions.

In 1886 Jurgens¹ first found the hemorrhagic liver lesions and claimed that he could demonstrate them constantly in eclampsia. He also found what he thought were liver cells in the lungs of some cases at postmortem examination.

In 1893 Schmorl² insisted that eclampsia had a definite complex of changes characteristic of no other disease. He reported seventy-three deaths with convulsions and three deaths late in pregnancy without convulsions, and at the autopsy he demonstrated lesions in the three cases without convulsions similar to those found in the convulsive cases. He noted lesions in the lungs also, though much more rarely than in the liver. He found placental cells in the lung in 150 cases, 83 of which had had eclampsia. Thus, we see that these cells can migrate, even in normal pregnancy. He carefully described the lesions in the kidney, liver, brain, and heart.

In 1902 Ascoli³ endeavored by experimental methods to determine the cause of the eclampsia, and attributed it to the overproduction of lytic substances.

The same year Weichardt⁴ and separately Scholten⁵ and Veit attempted a research in this field. Weichardt explained the mechanism as in certain bacterial diseases.

In 1907 Opie⁶ studied the zonal necrosis of the liver and stated that the periphery of the lobule is more likely to have fatty metamorphosis because it is in contact with blood from the portal vein. He claimed that the central zone was the chief seat of amyloid degeneration, while the central part of the lobule was the most common seat of pigmentary infiltration. He suggested a relation between infection and zonal necrosis.

Konstantinowitch⁷ in 1907 reported thirty cases with more attention given to the clinical history, and on the basis of the liver lesions he divided his cases as follows:

1. Peripheral zone shows moderately dilated capillaries while cells are rounded with a shrunken nucleus which stains poorly.
2. Fibrinous thrombi in the periphery with extending cellular degeneration.
3. Diffuse necrosis, not limited to the liver cells, sometimes involving connective tissue also. Areas are large.

Pottet⁸ and Kervily examined the thyroid gland in four fatal cases of eclampsia. They found a condition similar to the condition seen in puerperal sepsis.

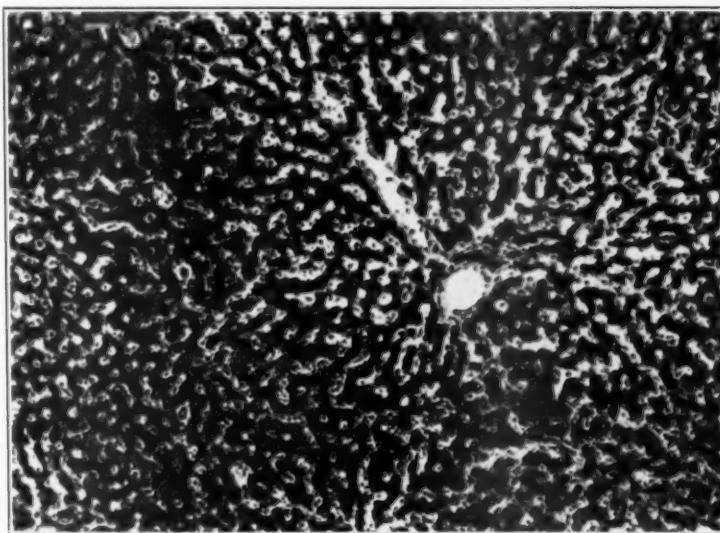


Fig. 1.—Passive congestion (low power). Narrowing of cords in central portion of lobules. No necrosis or other degeneration.

Also in 1907 Frank⁹ injected placental extract into the same and other animals in an effort to learn more of the mechanism of eclampsia.

In 1908 Chirie¹⁰ decided that suprarenal changes were not the cause of eclampsia. Eardley Holland,¹¹ in 1909, gave a review of the literature and inserted a few of his own ideas.

The work of J. Edgar Welch¹² also about 1909 is the finest contribution on the subject which it has been my pleasure to see. His cases are carefully studied from the clinical standpoint and are thoroughly worked out from the pathologic side.

In 1912 Franklin Newell¹³ gave the causes of death in eclampsia as follows:

1. Acute cardiae dilatation.
2. Edema of the lungs.
3. Cerebral hemorrhage.
4. Necrosis of the liver.
5. Shock.

Dr. J. Whitridge Williams¹⁴ at about the same time emphasized the differences between the toxemias of early pregnancy leading to pernicious vomiting and those of late pregnancy like eclampsia.

Young,¹⁵ in 1914, was the first man to study carefully the infarcts in the placenta, and he stated that the changed tissue gave rise to a toxin responsible for the clinical picture of eclampsia.



Fig. 2.—Section showing markings in left lobe. Necrotic area with cell outlines lost is separated from adjoining liver tissue by a definite wall of leucocytes. Outline of necrotic area and nearness of thrombosed vessel suggest an infarct.



Fig. 3.—Infarct and thrombosed vessel (very low power).

In 1919 Sir William Smyly,¹⁶ of the Rotunda Hospital in Dublin, called attention to a relation between accidental hemorrhage and eclampsia.

Foster S. Kellogg¹⁷ again stressed the relationship between infection and the toxemias of pregnancy. In this discussion he quoted data from the study of 400 cases of toxemia.

In 1920 Cleisz¹⁸ called attention to the strain upon the aorta in labor.

John A. Killian¹⁹ and Carl P. Sherwin worked upon the blood chemistry in toxemias of pregnancy and published their findings in 1921.

About the same time Dr. Wm. E. Caldwell,²⁰ working with A. G. Lyle, reported work of a similar nature. Both articles appeared at the same time and should be studied together, to get the best information upon this interesting phase of toxemia. The following year, 1922, Dr. O. M. Gruhzit²¹ suggested that agglutination of

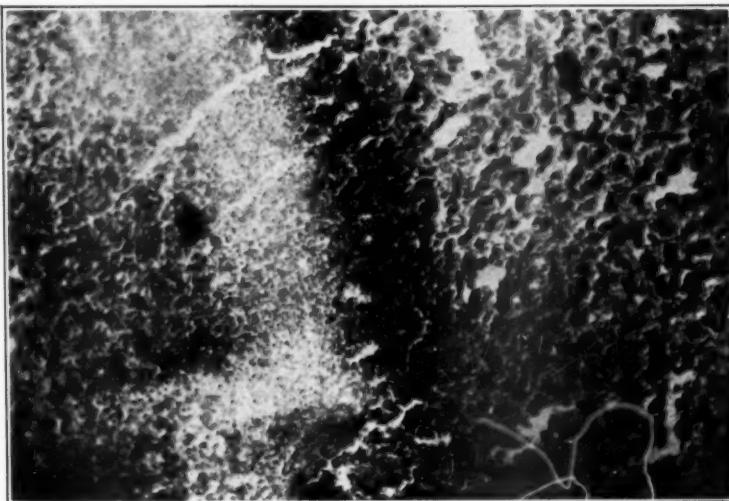


Fig. 4.—Wall of leucocytes (low power).

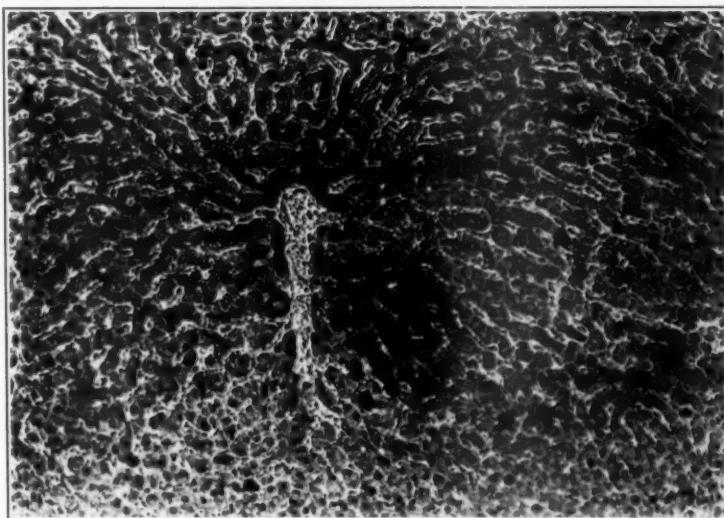


Fig. 5.—Localized deposit of fat (high power). Section with fat stain shows a dark island where fat is present; cords appear normal; nuclei are large; there is round-cell infiltration of the smaller portal spaces.

the fetal red cells by the mother's blood serum might be a factor in eclampsia, by giving small thrombi in the capillaries of the liver, kidneys, brain, etc.

McNalley and Dieckmann²² also in 1922 brought forward evidence showing the part which hemorrhage in the placenta plays in infarct formation. A large series of cases is quoted and the illustrations are splendid.

This brief review of the literature will serve to show that many factors must be given attention and will, I hope, form a background for a better understanding of the condition.

Turning to the records of the pathologic department, where thousands of complete autopsies are on file, but ten cases of eclampsia could be

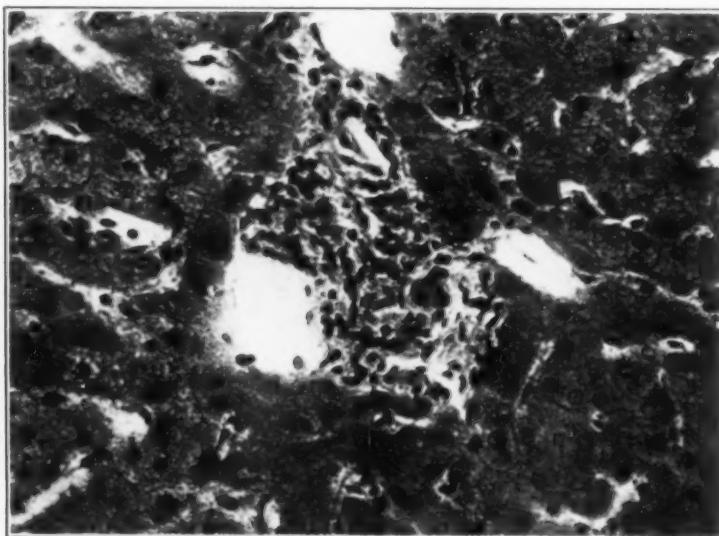


Fig. 6.—Round-cell infiltration of portal spaces (high power).

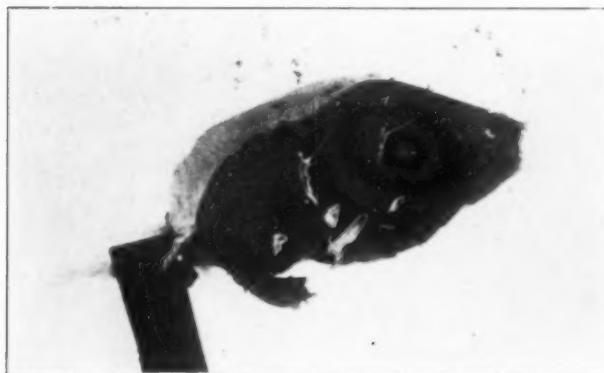


Fig. 7.—Section in acute yellow atrophy. Changes so marked as to make tissue difficult to identify; only the connective tissue framework is visible in some areas.

found. It was decided to take these ten cases and study them in detail. The separate organs were considered in groups for classification. The ten cases of toxemia form the basis for the data to follow:

1. All occurred during the last four months of pregnancy. Five of them had convulsions.
2. The majority of the patients had been ill from a few days to a few months.
3. Jaundice was noted at only one autopsy.

4. The diaphragm on the right side was found between the third rib and the fourth interspace, and on the left side from the fourth rib to the sixth interspace.
5. A subperitoneal hemorrhage covered a portion of the lower surface of the diaphragm in one instance.
6. Small amounts of fluid were present in the abdomen in three cases.
7. Half the cases had from 50 to 700 c.c. of fluid in one pleural cavity. In two cases the fluid was clear. In two cases it was bloody. In one case it was purulent.

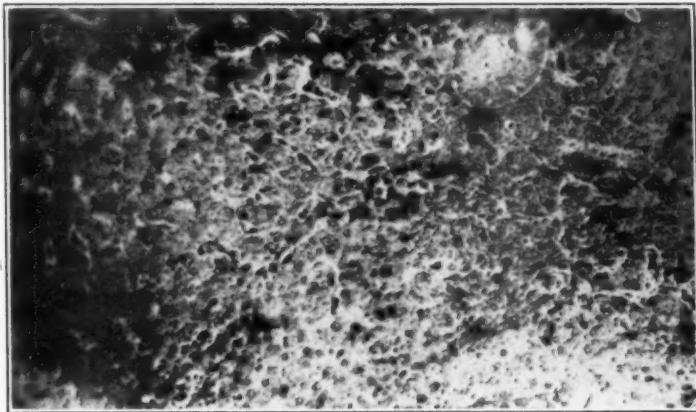


Fig. 8.—Diffuse fatty infiltration (low power).

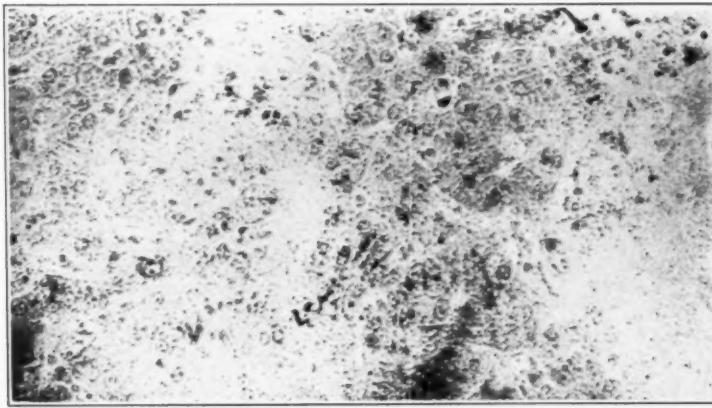


Fig. 9.—Diffuse fatty infiltration (high power).

8. In the half of the group having exudate present, lung lesions varying from passive congestion to solid nodules could be demonstrated.
9. Microscopically examined, these lungs revealed edema, chronic passive congestion, bronchitis, early bronchopneumonia, hemorrhage, and abscess.
10. The average weight of seven hearts was 325 grams. These varied from 260 grams to 500 grams. The largest heart was from a woman who weighed about 130 pounds.
11. The pericardium contained from 3 to 50 c.c. of fluid in every case. In two cases it was blood stained; in one case purulent.

12. The myocardium was variable in consistency from normal in most instances to soft and flabby in a few instances. Nothing of importance was noted in the coronaries.

13. The aorta was recorded as showing nothing more than a few patches of sclerosis.

14. The weight of the spleen in seven cases ranged from 90 to 290 grams, an

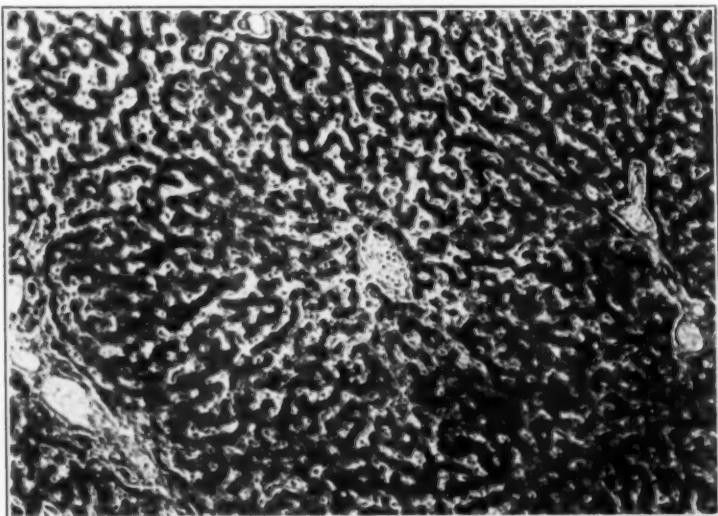


Fig. 10.—Passive congestion (low power). Slight passive congestion with some fat; cords narrow in centers of lobules.



Fig. 11.—Section showing extensive confluent subcapsular hemorrhages and red hemorrhagic areas. Areas of hemorrhagic coagulation necrosis; diffuse patches of swelling and vacuolization of cells; some cords much swollen.

average being 170 grams. In six cases the capsule was smooth or tense. Corpuseles were visible in eight cases. The color varied from pinkish gray to dark brown.

15. The appendix was present in every case and in no instance showed active acute inflammation.

16. The digestive tract showed no gross lesions. In two instances the stomach was found full of bile stained fluid.

17. No lesion was noted in the pancreas.
18. There was no gross evidence of disease in the adrenals.
19. The kidneys of eight patients ranged in weight from 120 grams to 220 grams. The capsule usually stripped easily, leaving a smooth surface. The cortex was often swollen and pale.
20. The right ureter was dilated three times. In one of the three cases the left ureter also was dilated. The bladder was dilated in two cases.

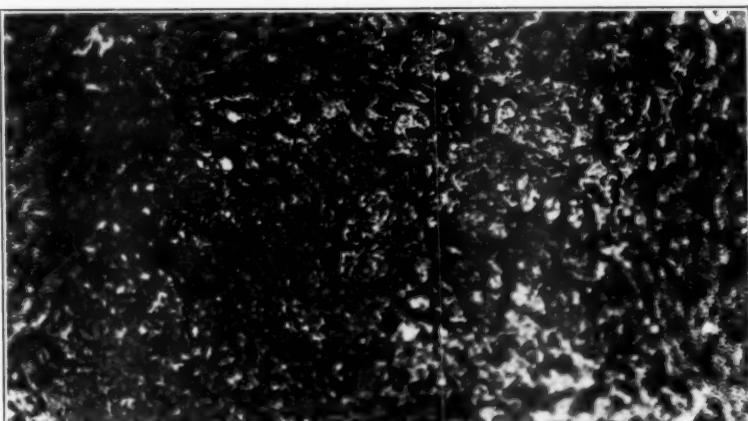


Fig. 12.—Focal hemorrhagic necrosis (low power).

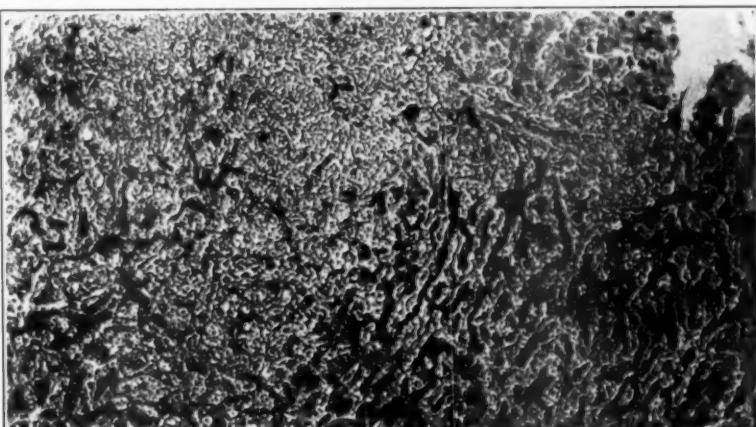


Fig. 13.—Focal hemorrhagic necrosis (low power).

21. No lesion of the gall bladder was noted.
22. The condition of the liver is of considerable interest and will be taken up separately for each case. The weight varied from 1295 grams to 2120 grams, with an average for eight cases of 1751 grams.

AUTOPSY 178.—*Gross:* Cloudy swelling present; pampiniform plexus intensely congested; few adhesions between both lobes of liver and the diaphragm. Left lobe soft, friable, and elongated. Lobular markings distinct. *Microscopic:* Culture from liver showed small white colonies of bacteria like *B. pneumoniae*.

AUTOPSY 10-73.—*Gross:* Liver weighed 1500 grams; paler than normal; a distinct band of fibrous adhesion between the liver and the diaphragm; in other areas a decided thickening of the capsule. On section there was a slight amount of congestion and from the cut surface quantities of fat could be scraped.

AUTOPSY 15-146.—*Gross:* Gall bladder and ducts normal; capsule smooth and clear, with a yellow appearance. Cut surface showed a blanched appearance due to postmortem embalming. *Microscopic:* (See Fig. 1.)

AUTOPSY 15-155.—*Gross:* Weight was 1820 grams. Gall bladder and ducts normal. Capsule smooth. Surface of left lobe was mottled with red and yellow spots. On section there were numerous yellowish patches of softening beneath the capsule. These extended under the major portion of the surface of the left lobe (Fig. 2). The central portion of the lobe was not involved. The right lobe showed no such areas. The cut surface of the right lobe had a pale yellow color, but the central portions of the lobules were dark red. *Microscopic:* (see Figs. 3 and 4).

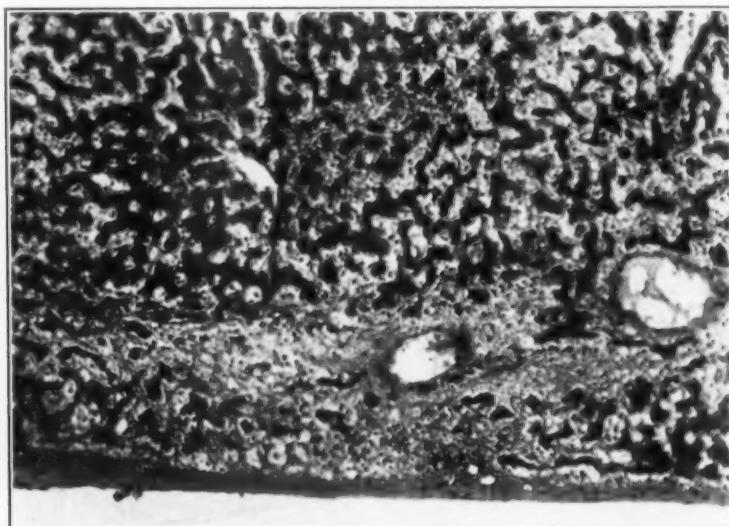


Fig. 14.—Coagulation necrosis beneath the capsule (low power).

AUTOPSY 16-197.—*Gross:* Weight 1908 grams. Margin well rounded. Capsule light chrome yellow and smooth. Cut surface mottled by a rather large yellowish white area with a pinkish yellow tinge. Lobular markings in themselves obliterated. Cut surface had a greasy feel and was friable. Gall bladder distended with thick, dark bile which contained mucus. *Microscopic:* (see Figs. 5 and 6).

AUTOPSY 18-171.—*Gross:* Weight 1500 grams. Lower margin corresponded almost exactly to the infracostal margin. The cut surface of the liver had a grayish yellow cast. The central veins stood out prominently and were surrounded by grayish yellow zones. The gall bladder showed no lesions. *Microscopic:* (see Figs. 7, 8 and 9).

AUTOPSY 19-190.—*Gross:* Weight 1950 grams. Capsule smooth and studded with hemorrhagic areas. These areas were larger and more closely set in the posterior surface than in the anterior surface. The cut surface everywhere showed irregularly distributed hemorrhagic areas varying in size from a few millimeters to 1 cm. The hemorrhages tended to be distributed in groups. The intervening liver tissue

was cloudy and slightly yellowish in appearance. No gross change in gall bladder or bile ducts. *Microscopic:* hemorrhagic areas show necrosis of the liver; cords are seen with escape of erythrocytes outside the capillaries; elsewhere there is diffuse fatty metamorphosis of the liver.

AUTOPSY 20-358.—*Gross:* Capsule smooth; surface showed no special markings; no lesions of the gall bladder. *Microscopic:* (see Fig. 10).

AUTOPSY 21-477.—*Gross:* Weight 1914 grams; external subcapsular hemorrhages over the superior, anterior, and lateral surfaces of the right lobe; a few such hemorrhages scattered elsewhere on the surfaces. The cut surface everywhere was studded with dark hemorrhagic areas. The intervening tissue had a brownish yellow color. No disease of gall bladder or bile ducts. *Microscopic:* (see Figs. 11, 12 and 13).

AUTOPSY 22-306.—*Gross:* Weight 2120 grams; surface smooth; color light brown. On section the color seemed normal. The consistency was not changed. The centers

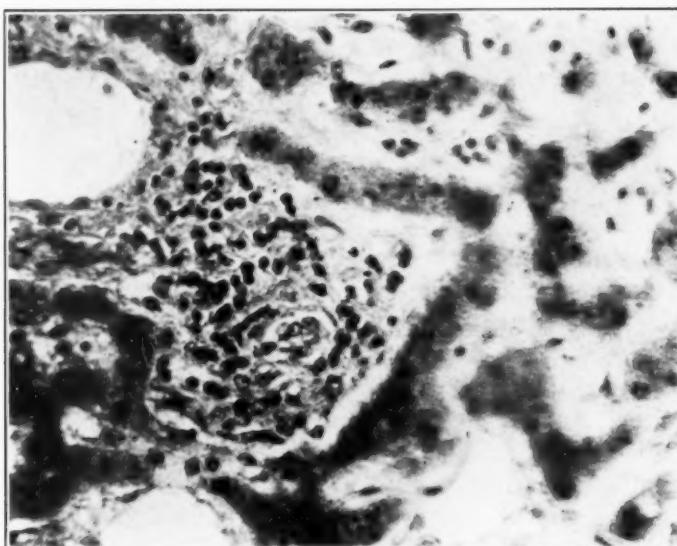


Fig. 15.—Cellular infiltration (high power).

of the lobules were not darkened. *Microscopic:* some cords stained faintly; small area of coagulation necrosis beneath capsule; some round-cell infiltration around the portal canal. (Figs. 14 and 15.)

SUMMARY

In these cases there is little agreement in the liver lesions, which include passive congestion, localized fatty infiltration, acute yellow atrophy, infarction, hemorrhagic necrosis, cellular infiltration (chiefly of portal spaces). These data weaken our belief in any one lesion of the liver being considered essential for toxemia of pregnancy.

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MEDICAL AND DENTAL BUILDING.

URETERAL OBSTRUCTION IN WOMEN*

BY GEORGE M. LAWS, M.D., PHILADELPHIA, PA.

MORE than 30 per cent of patients who come to a gynecologic service complain of urinary symptoms and it is evident that problems connected with the pelvic ureter must be dealt with by the pelvic surgeon. To be accurate in diagnosis he must recognize the pathologic conditions that are associated with lesions such as ureteritis, stricture, tuberculosis, kinks and distortions by the pregnant uterus, tumors and adhesions. This report is based chiefly upon a study of the last fifty patients personally examined by ureteral catheterization in the gynecologic service of the Presbyterian Hospital, in whom more or less ureteral obstruction was found.

The principal clinical diagnoses may be placed in the following groups.

Nephroptosis and hydronephrosis (noninfected)-----	5
Pyelitis, chronic or recurrent-----	4
Pyonephrosis -----	4
Pyonephrosis and renal calculi-----	3
Pyelitis of pregnancy and puerperium-----	5
Ureteral anomaly -----	2
Ureteral stricture, traumatic-----	1
Ureteral stenosis -----	8
Ureteral calculus -----	18
	—
Total -----	50

The obstructive lesion was actually a stricture in six cases, one tuberculous, two traumatic, following ureteral injury during complete

*Read at a meeting of the Obstetrical Society of Philadelphia, February 4, 1926.

hysterectomy and three inflammatory, verified by operation. It is believed that some of the cases in which the term stenosis is used were also strictures but they were not absolutely proved.

About two years ago the location of the point of obstruction in approximately half of the cases was charted. Fig. 1 shows the cases of impacted ureteral calculus and Fig. 2 the clinical diagnosis and the obstructive site in the noncalculus cases.

A review of this material showed that caleuli may be arrested at various points not corresponding accurately to the so-called normal points of anatomic narrowing. It is well known that the size of a calculus bears but little relation to its symptoms and that fairly large

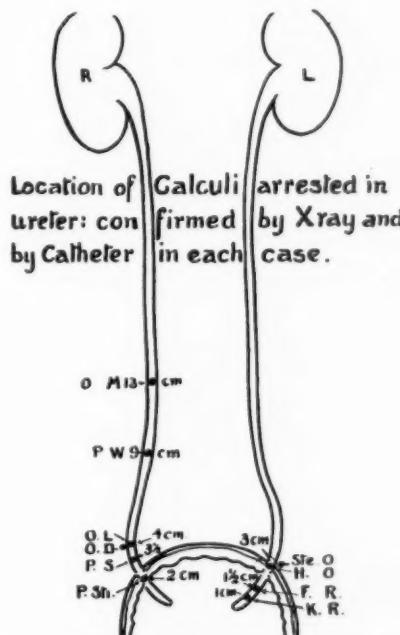


Fig. 1.—A series of impacted ureteral calculi showing the distance above the ureteral orifice at which each was arrested.

caleuli may be passed by some patients and small ones may become impacted in others. The caliber of the ureter is variable in different individuals and one can hardly define the normal caliber at different levels. The narrowest points seem to be at the broad ligament, about 3.5 cm. above the ureteral orifice, and at the ureteroovesical junction.

The symptoms of ureteral obstruction of various types are practically the same as those of an impacted ureteral calculus and vary with the location and degree of obstruction and with the presence or absence of infection and with its severity.

The chart of noncalculus obstructions represents patients that were examined by ordinary No. 5 or No. 6 catheters as a rule, since larger

sizes were rarely employed during the period in which they were examined. It occasionally happens that difficulty arises in passing a catheter beyond a certain point, but this can almost invariably be overcome by the use of another catheter or by an attempt at another sitting unless some pathologic process exists. The x-ray was used routinely and pyelograms and ureterograms were made occasionally. Functional tests, usually with indigo-carmine, were made routinely and were almost constantly indicative of reduced renal function when ureteral patency was found to be affected. The diagnosis indicated on the chart was proved by operation in a good many instances. The

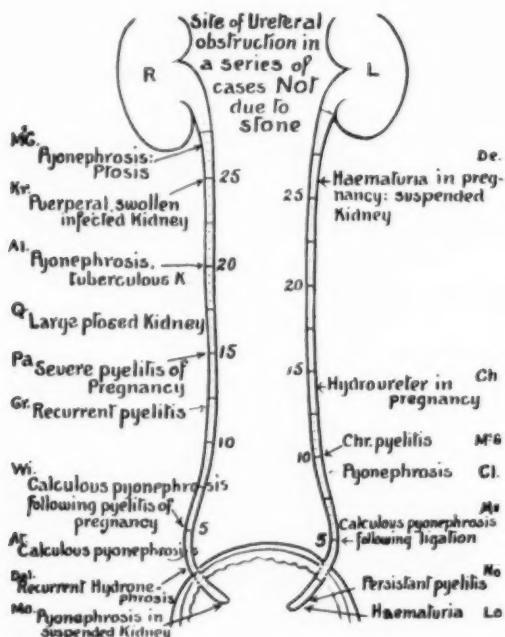


Fig. 2.—The chief clinical diagnosis in a series of noncalculous obstructions of the ureter and the location of the obstruction.

operations were performed by various members of the hospital staff and by the author.*

Obstruction in the ureter causes dilatation above it and dilatation of the pelvis as well as the changes in the parenchyma which have been shown. Hydronephrosis may occur without dilatation of the ureter and vice versa.

This study strengthened the conviction that obstruction, infection and stone formation are stages in the same pathologic process. Fur-

*The pathologic changes in the kidney parenchyma of some of the patients referred to in the chart are shown in Figs. 3-9. The descriptions were written by Dr. John Eliman, Pathologist at the Presbyterian Hospital, who studied them and who has pointed out the effects of ureteral obstruction which are not necessarily associated with dilatation of the pelvis. The credit for this work is his and the writer is indebted to him for the illustrations.

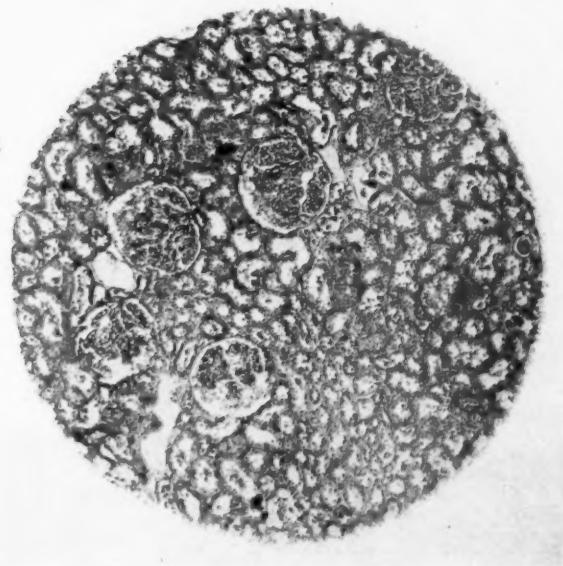


Fig. 3.—Movable kidney. Biopsy section secured at operation for Dietl's crisis. Dilatation of tubules due to back pressure which distends them. Cells in good condition but somewhat flattened out. Space of Bowman enlarged and glomeruli show degenerative changes.

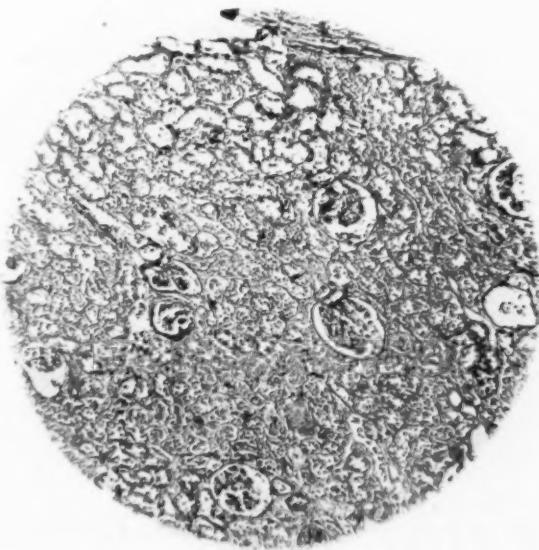


Fig. 4.—Biopsy section secured at exploratory operation for hemorrhage in pregnancy from a previously suspended left movable kidney. Changes due to back pressure. Cells show degenerative changes. Space of Bowman increased with atrophy of tufts.

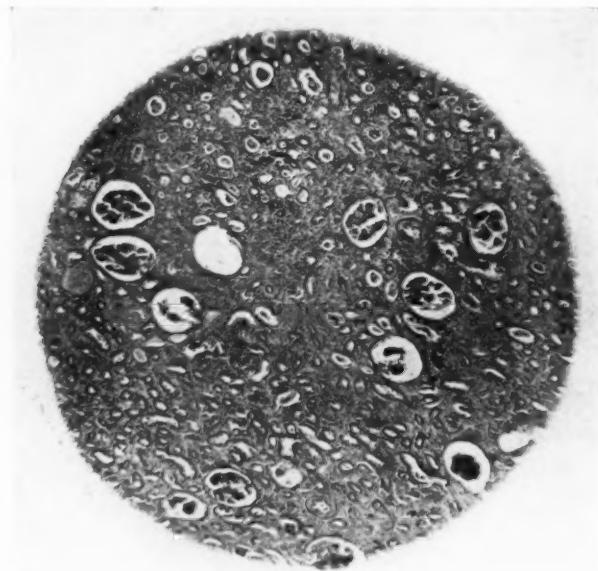


Fig. 5.—Nephrectomy for suppurative pyelonephritis and impassable ureteral stricture. Some chronic interstitial change with overgrowth of connective tissue. Pressure atrophy of tufts of glomeruli.

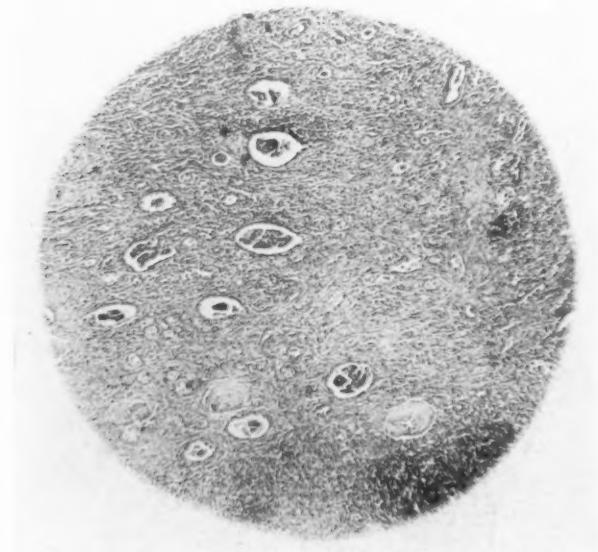


Fig. 6.—Nephrectomy for acute suppurative pyonephrosis and tuberculous kidney. Marked interstitial changes. Some hyalinized glomeruli; pressure effects on cells of glomeruli. Collection of round-celled infiltrations.

thermore it showed that the obstructions that had been recognized were associated with advanced pathologic conditions. This led to the belief that earlier stages and lesser degrees of obstruction should be

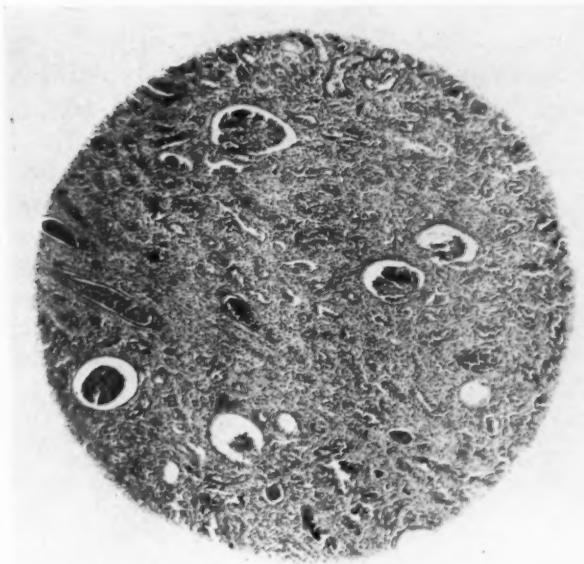


Fig. 7.—Nephrectomy for calculous pyonephrosis. Diffuse infiltrations with small round cells and polys. Effects of back pressure as seen in glomeruli.

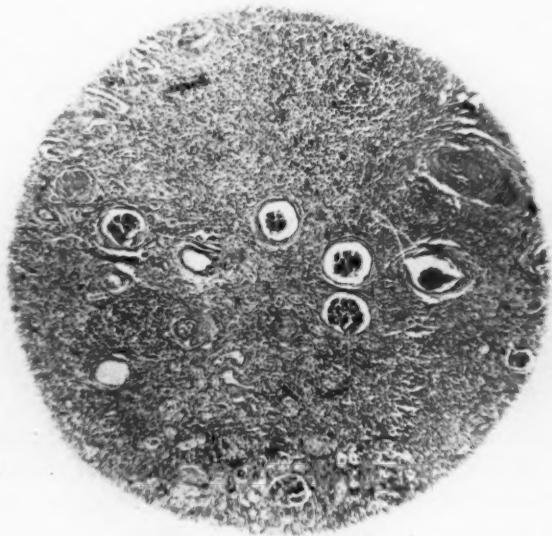


Fig. 8.—Nephrectomy for acute pyonephrosis and old nephroptosis. Ureteral kink. Chronic interstitial nephritis. Distended capsules of Bowman from back pressure. Atrophy of tufts.

diagnosed. To this end bulb catheters were employed, with the teachings of Hunner as a background, for investigation of what may be called strictures of large caliber and other form of ureteral stenosis

of lesser degree. Ureteral stricture can hardly be mentioned without raising many points that have been the subject of controversy between Hunner and his school, on one side, and certain eminent urologists on the other. These subjects are of the greatest academic interest and no doubt we shall eventually learn the truth. In the meantime one may try to form an independent opinion based upon his own work. Briefly the technie is the use of an indirect vision operating cystoscope which will permit the use of bulbs and dilating catheters up to 12 mm. in circumference. The bulb catheter is passed and the behavior noted, particularly as it is withdrawn. In seven patients, in whom no pathologic process could be found, the No. 10 bulb was



Fig. 9.—Nephrectomy for calculous pyonephrosis of long standing following pyelitis of pregnancy. Some interstitial changes but very distinct back pressure effects on glomeruli.

readily passed and withdrawn without the "hang," except in one instance when it could be seen to drag upon the bladder wall. These patients had had either repeated attacks of pyelitis or severe pain referred to the kidney region. They were regarded as negative.

In one patient who had chronic pyelitis with frequent renal colic and dilatation of whose ureter was shown by x-ray (Fig. 10) the No. 10 bulb was readily passed and no "hang" detected.

Marked improvement followed a single dilatation to No. 11 and lavage with mercurochrome. Further experience is required to determine whether or not this represents a "stricture" of a caliber larger than a No. 10, and raises the question whether one should be

content to dismiss the patients as having no stenosis, when the No. 10 bulb is withdrawn without a "hang."

Another patient had paroxysms of pain along the course of the pelvic ureter of about ten years duration, dating from an attack of cystitis. A distinct "hang" was felt, on withdrawing the No. 10 bulb, at a point 2 cm. above the ureteral orifice and the bladder wall was dragged upon and distinct bleeding immediately followed. The examination resulted in reproducing one of her typical attacks.

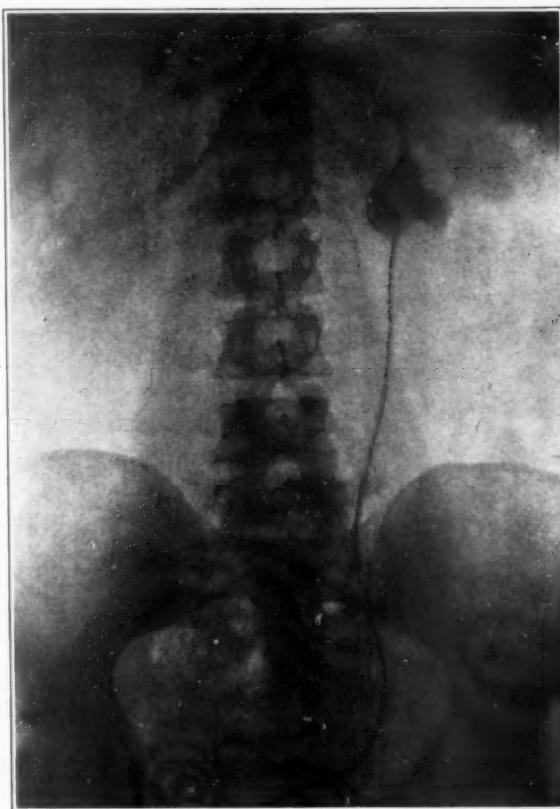


Fig. 10.—Pyelogram of patient with chronic pyelitis and recurrent renal colic following pyelitis of pregnancy.

The question before us at this time is: does this of itself mean "stricture," or does it mean "stricture" only if pyelogram or ureterogram show dilatation? Certainly one finds ureteral orifices too small to admit even a No. 10 bulb that have no associated symptoms and are presumably congenitally smaller than the average.

In another patient, who had chronic pyelitis, a No. 11 bulb would not pass through the ureteral orifice without trauma. On the other hand experience in dilating the ureter to help the passage of calculi

has shown that one can nearly always pass a bulb 12 mm. in circumference up to the calculus without too much force.

In four cases, in which the entire clinical study and repeated examinations were fairly conclusive of ureteral stricture, the No. 8 bulb corroborated this opinion by demonstrating a "hang" at the point of partial obstruction several centimeters above the bladder wall.

Two operative cases were found to have dense cicatricial strictures that had proved impossible even to No. 5 catheters as was a stricture previously reported which followed ligation of the ureter.

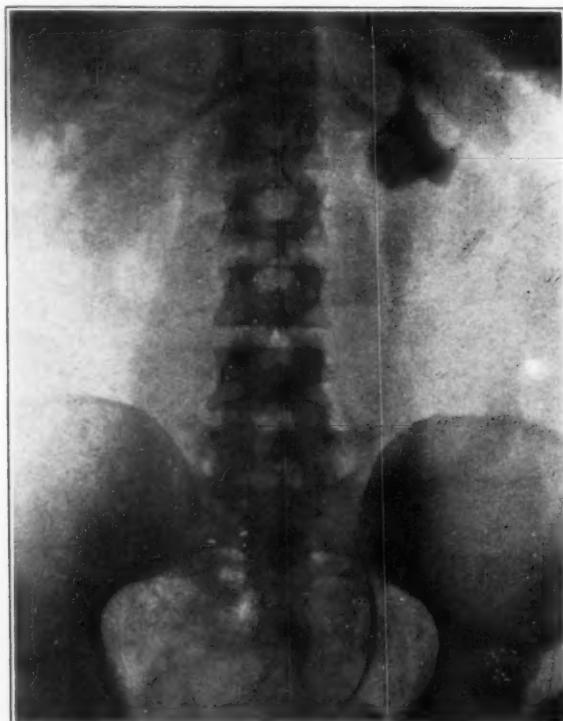


Fig. 11.—Same patient. Catheter partly withdrawn and ureter injected to show dilatation of ureter.

In another case of stricture following traumatic ureteral fistula and treated by gradual dilatation the No. 8 bulb revealed a "hang."

Before the time of using the bulbs for diagnosis the No. 9 Gareean dilating catheter was often noted as being gripped by the lower ureter at various levels on the catheter in such a way as to be fairly conclusive of decided stenosis.

The treatment of ureteral stricture one would expect to be analogous to treatment of stricture of other mucous canals and if possible by the plan of gradual, gentle dilatation. This has been effected in a few cases gaining one or two millimeters circumference at each treat-

ment. The dilatation should be at intervals not more frequent than ten to twelve days. Under this plan the gain is held and, when carried to what is believed to be full size, the gain is held for at least a number of months. Experience has not been long enough to determine whether or not it is permanent, but there has been no tendency shown to narrowing beyond the caliber of the last dilatation.

In one case of nephrectomy and one case of ureteral calculus, strictures that had been impassable from below were forcibly dilated by the operator from above. Both strictures promptly recurred.



Fig. 12.—Ureteral stricture of small caliber with moderate dilatation of ureter but without dilatation of pelvis.

One patient (Fig. 12) required twelve treatments to carry the dilatation from No. 6 to No. 14 and local pain was not relieved until this point was reached. The ureterogram taken at the second examination shows a moderate dilatation of the ureter.

After dilatation to No. 12 failed to give relief the patient was examined by Dr. Hunner in consultation and the diagnosis confirmed. The repeated demonstration of narrowing at two points and the "hang" found on several occasions during the process of gradual dilatation had been convincing that this was a stricture without infection.

CONCLUSIONS

1. There are various types of ureteral obstruction in women that are more frequent than ureteral calculus.
2. They are found associated with dilatation of the ureter, hydro-nephrosis or "back pressure" effects on the renal parenchyma. When these symptoms exist and calculus is not demonstrable, examination is usually indicated to determine the normal patency of the ureter.
3. Their symptoms are essentially similar to those produced by stone.
4. The bulbed catheter is the best instrument for this purpose, and for routine use it should be at least 10 mm. in circumference.
5. Gentle, gradual dilatation is the treatment of choice for ureteral stenosis.

2033 LOCUST STREET.

(For discussion see page 892.)

INTRAUTERINE DEATH OF THE FETUS DUE TO
ABNORMALITIES OF THE UMBILICAL CORD

REPORT OF THREE CASES*

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(From the Department of Obstetrics, College of Medicine, Tulane University of Louisiana)

THE majority of the textbooks on obstetrics which I have consulted, in discussing antenatal death in the latter part of pregnancy, consider particularly the questions of diagnosis and treatment. The possible causes of fetal death before the onset of labor are not mentioned in some works and are given but scant consideration in others, while a few texts cover the topic in a fairly satisfactory manner. The part played by cord anomalies is generally passed over. Williams, however, devotes three pages to the anomalies of the cord, but this discussion is not confined to those lesions capable of bringing about the death of the fetus. In most instances the intrauterine death of the fetus is due to syphilis, nephritis, or some other infection or toxemia from which the mother is suffering. Occasionally, painstaking investigation, including autopsy of the child, may fail to disclose the causative factor. Rarely, the seat of the trouble is found in the cord, and it is to this topic that I wish to direct attention.

This subject is considered in detail by Browne, of Edinburgh, in a recent paper. He has studied the matter carefully, as is shown by his bibliography of seventy titles. I am taking the liberty of quoting rather extensively from his article and wish to put on record three

*Read before the New Orleans Gynecological and Obstetrical Society, March 11, 1926.

cases of fetal death due to cord lesions which have come under my personal observation. I am not considering the cases of intertwining of the cords of single ovum twins, which condition may at times lead to the death of one or both babies. I have observed this complication several times, but feel that this subject is best reserved for separate discussion.

True knots of the cord, according to Williams, occur very frequently, while Browne says that "the occurrence of true knots on the umbilical cord must be looked upon as somewhat rare." He quotes von Winekel as stating that they occur in 0.4 to 0.5 per cent of all births, and also states that Chantreuil reported 7 knots in 6075 deliveries, while von Hecker recorded true knots 115 times in 31,590 births. Some authorities state that these knots are of developmental origin but the general consensus of opinion is that they are produced by the passage of the fetus through a loop of the cord. Undue length of the funis and abundant liquor amnii are no doubt contributing factors. As a rule, the knot is slack and the fetal circulation is not impaired. I have observed this condition several times. Some writers claim that these knots can never tighten to such a point as to cause fetal death. Browne, however, has proved experimentally that this is possible. A cord was cut away from the placenta one hour after birth. A cannula was placed in the umbilical vein and was also connected to a mercury manometer. It was found that fluid passed through the vein at a pressure of 10 mm. A slack knot prevented the passage of fluid until a pressure of 20 mm. was reached, while two knots raised this pressure to 60 mm. Weights tied to the distal end of the singly knotted cord raised the pressure at which the fluid passed to a still higher level, and it was found that a weight of 160 gm. prevented the passage of fluid at a pressure of 165 to 170 mm. As the arterial pressure in the cord varies between 39.3 and 83.7 mm. of mercury, according to Feldman, while the venous pressure is usually 16 mm., it can be seen that the circulation through these vessels may be completely shut off by a traction of moderate degree exerted upon the knot. Browne tabulates twenty-six collected cases of fetal death due to these true knots.

Torsion of the cord is another condition which in rare instances has been held responsible for the death of the fetus. Dohrn in 1861 (quoted by Browne) collected eighty-five such cases from the literature. A certain amount of torsion, of course, is found in practically every cord, one with no twists whatever being a rarity. The arteries are twisted around the deeper lying vein, usually from right to left; this is supposed to afford a measure of protection for the vein. It would appear that this physiologic torsion might easily become pathologic and it is surprising that fetal death is not produced in this manner more often than appears to be the case. Probably the mobility of

the fetus in the liquor amnii may contribute to the rapid untwisting of the cord before there is any interference with the circulation. It may be that, in case of fetal death due to torsion, there is some anomaly of the cord or some mechanical interference with the untwisting process. Browne is of the opinion that we are dealing with a thin cord, with little or no Wharton's jelly, and that this thin cord offers very slight resistance to the exaggeration of the normal torsion. There is thus a lack of elasticity, so that the "untwisting" is not so readily brought about. For example, the normal cord may be compared to a fairly thick rubber band, the other to a thin cotton string. Obviously, these, when submitted to torsion, would untwist at very different rates, and the rubber band would tend to a more complete recovery from the torsion than would the cotton string.

One of my cases falls in this group, and I will report it briefly. The patient had advanced a little past the eighth month of her second pregnancy, the first having terminated in an early miscarriage. Gestation had progressed normally. The pa-

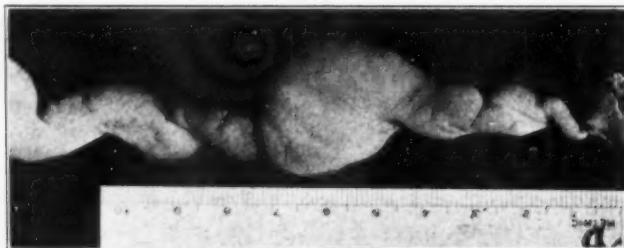


Fig. 1.—Note constriction at umbilical end of cord (a). Also marked torsion of remainder of section photographed.

tient noted rather excessive fetal movements, after which no further evidences of fetal activity were observed. Careful auscultation, repeated several times, failed to elicit fetal heart tones or uterine souffle, nor could any active movements be detected. One week after the cessation of fetal movements labor came on and a macerated infant was delivered. The cord was not measured, but was of normal length, and was very tightly twisted from the child's umbilicus all the way to the placenta. Close to the umbilicus the constrictions were especially marked (Fig. 1). Some of these twists were unwound, deep grooves were noted, and the cord resumed its condition of torsion when released. Only two vessels, an artery and the vein, were present (Fig. 2). Microscopic study of a segment of the cord, as well as of fetal liver, was negative. No *Treponema pallida* were found, and no lesions suggestive of syphilis were noted. The placenta showed no lesions other than a thrombosis of the vessels, and no treponema were found. The father's Wassermann was negative, as it had been on several previous occasions. The mother's blood was not tested, as the patient was delivered at home, and the husband, a physician, felt that the taking of blood for the test would occasion further mental disquietude. Both parents were perfectly healthy, and the cord condition was the only abnormality detected. I might remark that late torsion, such as occurred in this instance, seems to be the rarest form, being noted by Dohrn only once in the eighth month out of sixty-four cases. It is probable, in this case, that the presence of only one artery was a factor in the fatal

outcome, and it may be conceded that the torsion of itself might have resulted in death. But I am of the opinion that the torsion was the chief cause of the death of the baby. This patient has since been delivered of a living, healthy baby at term.

Occasionally, a localized constriction of the cord is found, most frequently at the fetal end, and involving an inch or so of the cord. I have observed two such instances. Extreme torsion may also be present, but was not noted in my cases.

In the first instance in which I noted this anomaly, the patient noticed cessation of fetal movements at the sixth month of gestation. She had previously given birth to a normal, healthy child, which is still living, and another healthy child has been born since this stillbirth. Careful and repeated examinations failed to elicit fetal heart tones or uterine souffle, and the uterus did not increase in size. Polak states that acetonuria is always present when the fetus is dead, but it was not found in this case. One month after the death of the baby, spontaneous

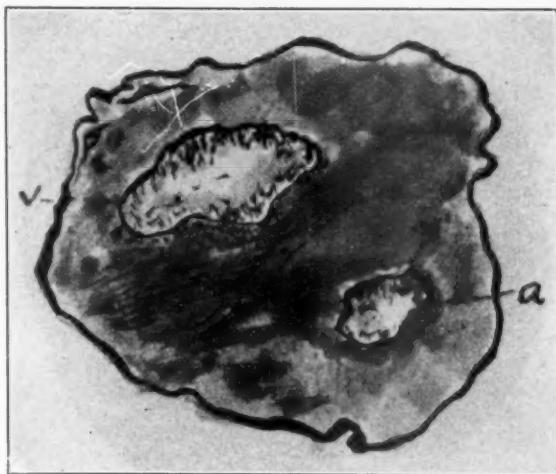


Fig. 2.—Drawing of a section through a part of the cord where it was of moderate diameter, showing only one artery (a) and one vein (v).

labor began, and a macerated fetus was delivered. The cord, of course, was flabby and discolored, but was otherwise normal except for a segment about one inch long, next the umbilicus, where it was very much constricted. This portion presented a shrivelled appearance, and there was no Wharton's jelly present (Fig. 3). There was no evidence of fetal, placental, or maternal lues. My second case of this character presented the same abnormality. This patient was also about six months pregnant, and the baby had been dead for many days. The cord was not sectioned in either case, as one specimen was saved intact, while the other was buried through error. However, I feel sure that the chief lesion was an obliterative inflammation of the vessels of the cord, as has been described in similar cases by Browne and others.

Many other lesions of the cord have been recorded by various observers. Browne has collected three cases of death due to ruptured varicosity of the cord, and one of death caused by ulceration of the umbilical vein. He also reports instances of hematomata, cysts, and solid tumors of the cord. Very rarely, fetal death may be due to

compression of the cord around the neck, or to syphilis of the cord. As a rule, however, syphilis causes death by its direct effect on the child, and the cord lesions, when present, are rarely of such a nature as to cause interference with the circulation. In the many instances of stillbirth due to syphilis which have come under my observation, I have not in any case noted sufficient macroscopic pathology of the cord to account for the death of the fetus.

In conclusion, I wish to recommend a more careful study of the cord in cases of antenatal fetal death, as I believe that in many instances the pathologic lesion responsible for the fatality will be found there. I do not think that my cases are as rare as one would infer



Fig. 3.—Marked torsion of cord for several centimeters at fetal end.

from the scanty literature on this subject, and I trust that other members of this society will put on record similar cases that they may have observed. I wish to thank Dr. Harold Cummins, of the Department of Anatomy, Tulane University, for his assistance in the preservation and study of the specimens here presented.

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MAISON BLANCHE BLDG.

(For discussion see page 903.)

MATERNAL AND INFANT MORTALITY IN 4488 CASES IN
AN OUTDOOR CLINIC, 1922-1925*

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(From Cornell University Medical College in affiliation with the John E. Berwind
Free Maternity Clinic)

THE methods of compiling maternal mortality figures differ in the various states and countries but the international code, accepted by the United States and several countries of Europe, is the best system that we have at present for recording the deaths. The maternal mortality figures for the United States are computed from the so-called Registration Area, which now consists of thirty-nine states and the District of Columbia. All but three of the southern states are included in this group, a fact that is important because the mortality in the colored women is nearly twice as high as in the white. The colored women are notably ill-constituted to bear the trials of pregnancy and labor because of their poor nutrition and the high incidence of rickets, tuberculosis and syphilis. In some regions, the latter disease affects more than a third of the women. Furthermore they are delivered by untrained midwives under conditions that lead to infection. To show how markedly these factors affect the rate, the 1922 figures of the Department of Commerce give a combined maternal death rate of 10.7 per cent for South Carolina, whereas Minnesota which has an almost entirely white population with high standards of education, has a rate of 4.9 per cent. Notwithstanding the high death rate in the colored women, the figures for the United States are close to those of Great Britain, the country with which we may most readily be compared.

TABLE I
MATERNAL MORTALITY—ENGLAND, SCOTLAND, WALES AND THE UNITED STATES,
1921, 1922

	CRUDE RATE				ADJUSTED RATE*			
	Eng. Scot. Wales		United States		Eng. Scot. Wales		United States	
	1921	1922	1921	1922	1921	1922	1921	1922
All puerperal causes	8.1	7.2	6.6	6.5	6.9	6.0	6.7	6.6
Puerperal sepsis	3.5	2.5	2.6	2.3	3.2	2.2	2.6	2.3
Other puerperal causes	4.6	4.7	3.9	4.2	3.7	3.8	4.0	4.3

*Adjusted rate on basis of standard 1,000,000 live births of 1917.
(Figures obtained from census report.)

There is an element of injustice in the contention that the United States is seventeenth on the list of civilized countries in their maternal mortality rate. In order to make a comparison with other countries their methods of collecting and compiling their statistics must be thoroughly investigated, otherwise we find Russia presenting very

*Read before a meeting of the New York County Medical Society, March, 1926.

low figures that can hardly be in conformity with the actual facts. There is so much free talk about statistical figures that one should view them with skepticism.

I present here the results of our attempt to reduce maternal deaths. The circumstances and conditions that arise in an outdoor delivery clinic are not very different from those confronting the general practitioner, and our work is described with the hope that certain applicable features may be adopted by him.

At the close of the year 1921, Cornell University Medical College formed an affiliation with the John E. Berwind Maternity Clinic,—an organization that had been giving maternity care for the past twenty years,—by which the medical control passed to the former institution. We have, therefore, four years, 1922 to 1926, in which the

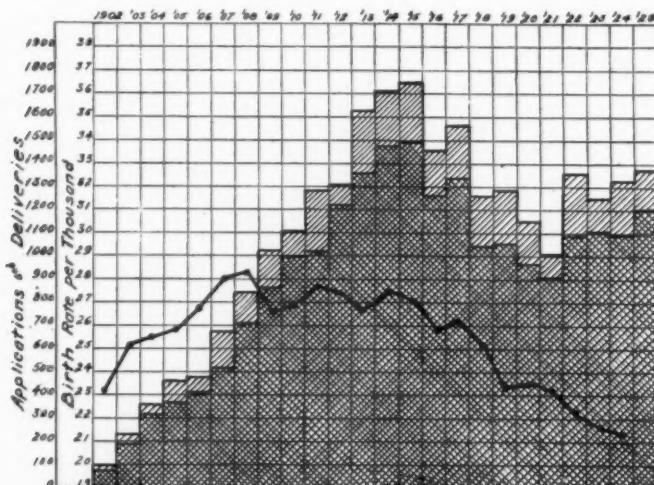


Fig. 1.—John E. Berwind Free Maternity Clinic, 1902-1925.
Dark Area: Deliveries. Light Area: Applications. Dotted Line: Birth Rate in New York City per 1,000 Population.

clinic has been a teaching service for the Cornell Medical School and it is here that the fourth year students have obtained their practical work. This clinic is housed in a suitable building with quarters for the students and has a resident staff of four men. There are twelve nurses, including those in the maternity and infant divisions. The clinic is aided to some extent by the Henry Street Settlement whose nurses make some 4000 visits a year.

At the present time it is exceedingly difficult for any institution to keep up the number of deliveries in its outdoor clinic because, first, there is an increasing tendency for the women to seek hospital care and, secondly, due to the high cost of nursing service, the patients find it less expensive to have a private doctor than to have clinic care. We have decided that this latter cause shall not be operative in our clinic and as a result we have had a gradual but steady growth, although the birth rate in New York City is constantly decreasing.

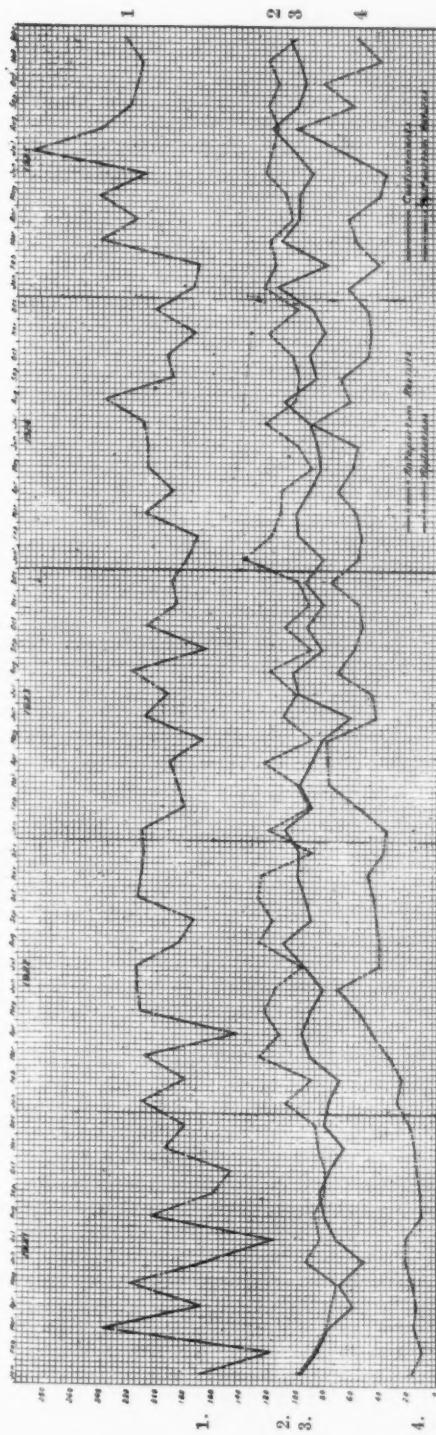


Chart Showing Variations in the Clinic Activities. Line 1. Number of antepartum revisits. 2. Number of applications. 3. Number of confinements. 4. Number of postpartum return visits.

Our postpartum follow-up visits are approaching the number of deliveries and the deliveries themselves are close to the applications. The total number of visits for the four years—antenatal, natal and postnatal—is 74,207; 19,294 were made by doctors and students, 41,125 by nurses and 13,788 antenatal and postnatal visits were made by the patients to the clinic. Most of the women apply for care about the seventh month, a factor that must be remembered when a study is made of our mortality figures which are lowered by the absence of deaths from abortion, ectopic pregnancies and accidents of the early months.

In addition to the antenatal and delivery care, there is a follow-up clinic and cases requiring operative repair are transferred to another of our teaching hospitals. At the end of two weeks the babies are transferred to the Pediatric Department of the clinic where they are cared for throughout one year. Forty-five per cent of our patients by actual count, are either colored or Porto Rican and, as we have pointed out, the negress is a poor maternal risk.

The principal idea of this service and the one that is applicable to general practice was ably described by A. C. Beck in his paper published in this Journal in 1923 and we believe that its adoption should be encouraged. This is that all major abnormalities should be transferred to a hospital, if possible before interference. The outdoor department of our clinic stands in relationship to a hospital that is ready to receive at all times the abnormal and emergency cases that arise in the course of the service. All major abnormalities are transferred, if possible before interference or even before labor. At first thought it might seem that this plan, if adopted by the general practitioner, would make him little more than a male midwife but the actual results show that he would still have a considerable number of operative cases. Although our maternal mortality figures are low, we believe that they could be further reduced if we had ambulance facilities to make our own transfers. As we have not been able to do this, a few of the cases have been admitted to hospitals not under our control. Our follow-up, however, includes these patients.

Students, under the direction of the resident, are permitted to make vaginal examinations, but unnecessary and repeated examinations are discouraged. Rectal examinations are not made as we believe they tend to increase sepsis through the mechanical raising, by the probing finger, of the lower part of the vaginal tract toward the open cervix. At the end of two weeks, the student usually has fourteen deliveries to his credit. In at least one-half of these he has delivered the patient himself and in the remainder he has acted as assistant. In addition to his delivery work he has attended the prenatal clinics and made postpartum calls on the patients that he has delivered.

TABLE II

BERWIND MATERNITY CLINIC FORCEPS DELIVERIES IN 4488 CASES, 1922-1925

	1922	1923	1924	1925
High Forceps	8	8	12	4
Mid Forceps	18	29	16	21
Low Forceps	14	4	19	13
Total Forceps Deliveries	166.			
Infant Deaths		23 (2 Macerated).		
Maternal Deaths		0.		

The operative work in the outdoor cases consists almost entirely of forceps deliveries, versions and procedures for the control of hemorrhage and is conducted by the resident in the presence of a member of the visiting staff. Cases for cesarean section and antenatal bleeding cases are transferred to a hospital.

In our 4488 cases there were 164 forceps procedures or an incidence of 3.6 per cent. No mothers died. The infant death rate was 12.6 per cent; but for the mid and low forceps operations it was 7.8 per cent. Perhaps some criticism might be directed toward the frequency of high forceps operations, especially as the infant death rate was 25 per cent. For the most part there were no versions following attempts at forceps delivery as we are convinced that this is not a proper procedure. Every emergency hospital receives from the outside a number of cases of ruptured uteri that are the result of version following forceps procedures. However, in an outdoor service it occasionally seems necessary to do a version after an attempt at forceps and in our few operations of this type we were fortunate in having no accidents. Our only case of ruptured uterus was one of multiple pregnancy in which the first twin was delivered by low forceps and the second by version and breech extraction.

TABLE III

BERWIND MATERNITY CLINIC BREECH DELIVERIES IN 4488 CASES, 1922-1925

	1922	1923	1924	1925
Version and Breech Extraction	19	16	13	14
Breech Extraction	2	12	8	13
Spontaneous Breech	20	38	34	37
Total Breech Deliveries	226.			
Infant Deaths		35 (7 Macerated).		
Maternal Deaths		0.		

There were 62 versions and breech extractions and, excluding macerated fetuses, the total infant mortality was 27 per cent. If these deliveries are combined with the breech extractions and the spontaneous breech deliveries, there is a total of 226 cases with a 12 per cent infant death rate.

We encountered 150 contracted pelvis. Five of these cases were transferred to the hospital for cesarean section. In the remainder there were three high forceps, seven mid and low forceps and four versions. Two mothers died; one, after transfer for a cesarean sec-

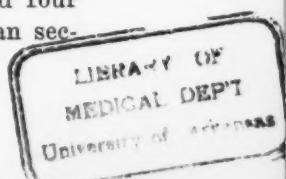


TABLE IV
BERWIND MATERNITY CLINIC ABNORMALITIES AND COMPLICATIONS IN 4488 CASES, 1922-1925

	NO. OF CASES	MATERNAL MORTALITY	NO. OF CASES	MATERNAL MORTALITY
Forceps	167 (3)	0	69 (13)	1
Version and Breech Extraction	62	0	6	0
Breech Extraction	35	0	25	0
Cesarean Section	5 (5)	1*	4	0
Craniotomy	1 (1)	0	3	0
Inversion of Uterus	1 (1)	1	10 (9)	1
Rupture of Uterus	1	1	11	0
Placenta Previa	17 (11)	2	8 (1)	0
Premature Separation Placenta	13 (6)	1	16 (1)	0
Postpartum Hemorrhage	17 (4)	1	4 (3)	0
Manual Extraction Placenta	16 (3)	2	2 (1)	1
Eclampsia	9 (7)	1	7	1
	344	10	166	4

*Anesthetic Death.
(Figures in parentheses indicate number of cases transferred to hospitals.)

tion, died from the anesthesia just as the abdomen was opened and the other, from sepsis which followed manual removal of the placenta. In the 150 cases there were 6 infant deaths.

TABLE V
BERWIND MATERNITY CLINIC. INFANT DEATHS IN 4488 CASES, 1922-1925.
RATE 5.2 PER CENT

	STILLBIRTHS	NEONATAL DEATHS
Difficult Labor		
Operative Delivery	36	12
Spontaneous Delivery	2	5
Prematurity and Injury	12	23
Congenital Abnormality	4	13
Maceration		
Death in Utero	51	0
Toxemia and Syphilis	19	0
Placental Abnormality	4	0
Cord Anomaly	9	1
Pneumonia	0	2
Atelectasis	4	6
Miscellaneous	16	16
	157—3.5%	77—1.7%

Many complications have occurred in the 4488 deliveries and we present a summary of them in order to indicate the types of cases that we have felt it desirable to transfer and also to show the end-results. In our own and the transferred cases we had 12 obstetric deaths or 1 in 374 cases,—a rate of 2.67 per 1000 live births and stillbirths. In the cases delivered by the clinic there were 7 deaths or 1 in 641 cases, giving a rate of 1.56 per 1000 live births and stillbirths. In a careful review of the deaths we feel that with improved judgment there might be even a further reduction.

TABLE VI
BERWIND MATERNITY CLINIC
MATERNAL MORTALITY IN 4488 DELIVERIES, 1922-1925

DEATHS FROM MEDICAL COMPLICATIONS	
1 MENINGITIS	1 HEART DISEASE
OBSTETRICAL DEATHS	
<i>After Transfer to Hospital</i>	<i>Actual Mortality at Berwind</i>
1 Preeclampsia. (Developed eclampsia at hospital.)	2 Manual Removal of the Placenta.
1 Placenta Previa. (Vagina packed before transfer.)	1 Sepsis. (Scarlet fever in family.)
1 Premature Separation of Placenta. (28th week. Transferred without operative interference.)	1 Chronic Nephritis and Shock.
1 Anesthetic Death. (32 hours labor at home.)	1 Placenta Previa. (Delivered in Clinic. Transferred to hospital.)
1 Inversion of Uterus. (Delivered out of service. Stopped at Clinic seeking hospital care. Transferred to hospital.)	1 Rupture of Uterus.
	1 Postpartum Hemorrhage.

Total Deaths—14 or 1 in 320 cases.

Obstetrical Deaths—12 or 1 in 374 cases—2.67 per 1000 births.

Berwind Delivery Deaths—7 or 1 in 641 cases—1.56 per 1000 births.

Our stillbirth and neonatal death rate—5.2 per cent—is not as low as we might expect and it is twice as high as the rate given by Beck in his cases in a teaching service in Brooklyn. We have listed these deaths under their direct causes as far as we could determine them and, as we were fortunate in securing a considerable number of autopsies, we feel that they are properly classified etiologically.

Some degree of infection followed in 48 cases but there were only two deaths, one mentioned above under manual extraction of the placenta and one a case of sepsis occurring in a family in which there were two cases of scarlet fever.

There were 6 complete tears that were repaired at once.

SUMMARY

With close control and adequate facilities a teaching service can be conducted with considerably lower death rate than that generally prevalent in the community. In our cases there is a reduction of 50 per cent below the figures for New York State. The stillbirth and neonatal death rate of 5.2 per cent is more than 30 per cent lower than the figures for New York City. We believe that these low figures are due to the transfer of the major operative cases to suitable hospitals as early in the labor as the complications become evident and to the aseptic technic in the conduct of labor.

119 EAST SEVENTY-FOURTH STREET.

PERIODICITY OF SEX DESIRE

PART I. UNMARRIED WOMEN, COLLEGE GRADUATES

BY KATHARINE BEMENT DAVIS, PH.D., NEW YORK

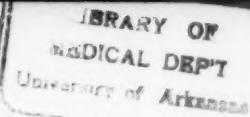
General Secretary, Bureau of Social Hygiene

DURING the last few years there has been considerable study of the estrous cycle of animals. Loeb of Washington University, Stockard of Cornell, and Evans of California among others have attacked the problem from various angles.

Corner, of Rochester, has studied the relation of ovulation and menstruation in monkeys (*Macacus rhesus*). The study of the human reproductive cycle, because of the greater difficulty of approach, has not been carried so far as with the lower forms of life. A beginning, however, has been made by Schroeder, Meyer and Ruge, among others.

The importance of the study is obvious on account of its practical bearing. Menstruation, ovulation, conception, sexual desire, are all parts of it. The old notion of a "safe period" is one of the supposed contraceptive methods known to a majority of women.

Investigators in the human field, it is said, have been held back partly by lack of critical information on the psychical side—that is,



in the matter of a wave of sexual desire in women in relation to the menstrual period.

In our study of the sex life of normal women,¹ the questionnaires for both married and unmarried women touch upon this. The questions asked of the unmarried were more detailed and were more fully answered than those asked of the married women. The information gathered from these questionnaires is far from being as definite as desired. The comment of several of the women replying, "We should have been given a period for observation before being asked to reply," is a valid criticism. We present what there is, however, for what it is worth.

We will first consider the reports of 1000 college and university graduates unmarried and at least five years out of college.

Section III of the questionnaire, dealing with Sex Feeling and Sex Experience, begins as follows:

A. Sex Feeling.

1. (a) Do you recall having had any sex feelings or impulses during childhood (up to beginning of menstruation)? Spontaneous (physiologic) excitation of organs; pleasure in handling organs; desire for sex excitement; sex day dreams; curiosity about sex affairs of parents or other adults; strong attraction for boys and men; any other?
 - (b) Did the appearance of menstruation arouse any feelings or emotions? What? Did you experience any increase in intensity or frequency of sex feelings up to college entrance?
 - (c) Were such feelings increased in intensity or frequency during college course? Decreased?
 - (d) Since leaving college—Increased in intensity or frequency? Decreased?
2. If you are conscious of definite sex feelings or desires do they arise at more or less regular periods? If so,
 - (a) How many marked periods of desire do you have between menstruation?
 - (b) What relations in time do they have to your menstrual period? During? Before? After?
 - (c) If you have more than one such wave of desire between menstruation, are they of equal or different intensity and duration? How far apart are they? How long do they continue?
 - (d) Are these periods of desire (if any) strong enough to produce temptation to sex indulgence? To diminish resistance to temptation?

Further questions relate to definite sex practices and experiences and the answers are discussed in part in a previous paper.²

A discussion of the answers to Section III, A-1, will be given in detail in a future paper. The first part of the present study concerns itself with questions under A-2, and their correlation with answers to questions on sex experience.

TABLE I

A-1 Entire question unanswered -----	10
Deny any sex feeling or any sex desire at any period in their lives -----	182
Admit sex feeling or desire at some period -----	808
Total -----	<u>1000</u>

These answers, however, are not always consistent with the answers to other portions of the questionnaire. Of the 10 who fail to answer question 1 in answer to questions on masturbation, two admit the practice for a short time, one as a child and one as a girl between fifteen and twenty. None of these 10 admit sex intercourse, or homosexual experience. None admit sex problems, although two fail to answer the section on problems.

Only 124 of the 182 who categorically deny any sex feeling or sex desire are consistent throughout their entire papers.

TABLE II

Deny any sex feeling or practice throughout life -----	182
Papers entirely consistent -----	124
Papers inconsistent -----	58
Of these—	
Have present sex problems -----	14
Make comments indicating sex feeling -----	9
Admit masturbation in the past -----	24
Admit masturbation at present, sex intercourse, or homosexual experience -----	11
	<u>58</u>

A brief description of the 58 inconsistent cases will be inserted in the reprint of this article because they illustrate what seems to be sex feelings which the writers are unwilling to call by that name, an attitude perhaps quite common among unmarried women of the ages covered in this study.

TABLE III
RELATION OF ANSWERS TO A-1 AND A-2

Reply "Yes" to question A-1 -----	808
Of these in answer to A-2—	
Have observed regular periodicity -----	272
Have observed irregular ² periodicity -----	298
Have observed no periodicity -----	238
	<u>808</u>
Reply "No" or fail to answer question A-1 -----	192
Of these—	
Question A-2 unanswered -----	99
Question A-2 No -----	93
Total -----	<u>192</u>
Total -----	<u>1000</u>

A glance at Table III shows that of the 808 women who answered "Yes" to question A-1, there are 238 who in answer to the first ques-

tion under A-2 say that they have never observed any periodicity of sex desire. They reply with an unqualified "No." In 298 cases a certain amount of information is given. There is a relation perhaps between the feeling of desire and the menstrual period, but it is not regular each month, or, such a desire while irregular does give rise to temptation to sex practice, etc., etc.

There are, however, 272 women who state that they have observed regular periodicity of desire. These answer the other points under A-2 as follows:

III A-2

(a) Number of periods of desire observed—

One period	126
One or two periods	26
Two periods	89
Two or three periods	18
Three periods	2
Three or four periods	2
Four periods	4
Four or five periods	2
"Several" periods	2
"Many" periods	1
	<u>272</u>

(b) Relation of desire to Menstrual Period.

Those who have observed one period find it occurs—

Before menstruation	69
After menstruation	38
During menstruation	3
Before and during menstruation	9
During and after menstruation	3
During, between and after menstruation	1
Midway and after	2
"It may be just before or just after, but never during menstruation"	1
	<u>126</u>

Those who always experience one and sometimes two periods just before or just after menstruation find they occur—

Just before or just after menstruation	4
Just before or just after menstruation or both	4
Just before and occasionally after	2
Before sometimes, and after always	5
Before and occasionally during	1
After and occasionally during	1
After—no further explanation	2
Just before	3
"In between"	2
About 10 days after and occasionally 10 days before	1
The week before sometimes and a few days after	1
	<u>26</u>

Those who always experience two periods find they occur—	
Before and after menstruation	56
Before and during menstruation	8
During and just after menstruation	2
Both before menstruation	3
Both after menstruation	5
Just before and midway	4
One week before and midway	1
During and midway	2
Just after and midway	2
Ten days before and during menstruation	1
A week before and during menstruation	1
Just before and about 10 days before that	2
Just before and during (one period) and after	1
A week before and a week after	1
	89
Those who have observed two or three periods find they occur—	
Just before and after menstruation	2
Before and after (a week or so apart)	2
Before and midway	1
Before and after and midway	1
Before usually—sometimes during	1
Before and after and sometimes during	2
Before, during and sometimes after	1
Before and during	2
Before, after and during	1
Before usually, during rarely—after sometimes	1
Just before, just after and sometimes a week later	1
After (no time given)	1
Just before, midway and sometimes during	1
Two or three times in the week before	1
	18
Those who have observed three or more periods find they occur—	
Three periods—before, during and after	2
Three or four periods—before, during and after	2
Four periods	4
Weekly	2
Before, then others 5 to 7 days apart following	1
Before, after and one or two between	1
Four or five periods	2
During, after and before, 4 or 5 days apart	1
From a day or so before to a day or so after	1
“Several periods”	2
Beginning just after, in the week or 10 days following	1
Usually before, occasionally after	1
“Many” periods several days apart throughout the month	1
	13
(e) The 120 who recognize two or more periods.	
<i>Intensity Compared—</i>	
Unanswered	47
The same	19
Different	51
Cannot tell	3
	120

Duration Compared—

Unanswered	81
Equal	11
Unequal	23
Cannot say	5
	120

Distance Apart—

Unanswered	40
Cannot say, varies	7
A few days	12
Five to seven days	1
A week	18
A week or so	2
A week or ten days	1
Ten days	12
Two weeks	21
Ten days to two weeks	3
One day to two weeks	1
Indefinite	2
	120

Duration—

Unanswered	35
Cannot say	3
Until satisfied	13
A few seconds	2
A few minutes	8
A short time	5
Varies with occupation	2
An hour or so	3
A few hours	4
A few hours to days	4
A day	3
A day or two	14
Several days	11
Two days	3
"Days"	1
A week	2
A week to ten days	1
A few minutes to 2 or 3 days	3
From three-quarters of an hour to a day	1
A few minutes to a few hours	1
Sometimes almost the whole interval between periods	1
	120

(d)

Temptation to Sex Indulgence—

Unanswered	33
Yes	119
No	99
Sometimes	13
Possibly	4
Formerly; not now	3
Reads love stories to the neglect of important duties	1
	272

Weakens Resistance to Temptation—

Unanswered	119
Yes	80
No	62
Sometimes	1
Possibly	5
In some ways	1
Formerly; not now	2
Do not know	2
	272

Of the 272 who recognize periodicity of desire, nearly one-half, or 126, state that it occurs at approximately the same time each month. In 26 instances a second period is sometimes but not always observed. In 89 cases two periods are always recognizable, while in 18 more two periods always are observed, with sometimes a third. The remaining 13 cases are scattered, lying between "three" and "many."

In the consideration of this problem the exact relationship of the desire to the menstrual period is probably the most important factor.

In textbooks on physiology and reproduction it is commonly stated that sex desire in women is strongest *after* menstruation. For example, W. H. Howell in his *Textbook of Physiology* writes: "The sexual excitement that attends the condition (heat of estrous) in lower animals is not distinctly represented in man, although it is commonly said that in the period following menstruation the sexual desire is stronger than at other times.³

Francis Hugh Adam Marshall in his *Physiology of Reproduction* makes the same statement. "The period of most acute sexual feeling is generally just *after* the close of the menstrual period."⁴ Havelock Ellis in his *Psychology of Sex* writes: "Whatever doubt may exist as to the most frequent state of the sexual emotions during the period of menstruation, there can be no doubt whatever that immediately before and immediately after, very commonly at both times,—this varying slightly in different women,—there is usually a marked heightening of actual desire."⁵

Ellia quotes Kraft-Ebing who places the heightening of sexual emotion at the postmenstrual period, Adler who states that it is increased before, during and after menstruation, and Harry Campbell who as a result of certain inquiries made of their husbands who were patients at a London hospital, declares of their wives that the proportion of cases in which sexual feeling was increased before the flow, to those in which it was increased after, was as three to two.⁶

Marie Stopes in *Married Love* presents a chart showing "The Periodicity of Natural Desire in Healthy Women."⁷ "Various causes make slight irregularities in the position, size and duration of the wave-crests, but the general rhythmic sequence is apparent."

In this diagram the strength of desire is shown to be the greatest in the three or four days preceding menstruation, lasting three or four days, and again from the seventh to the tenth or eleventh day following, dropping below the "level of potential desire" during the menstrual period. Miss Stopes gives no intimation of the extent of the data on which her chart is based nor of her method of obtaining them.

TABLE IV
PERIODICITY OF DESIRE WITH REFERENCE TO THE MENSTRUAL PERIOD

NUMBER OF PERIODS	BEFORE	DURING	AFTER	"BETWEEN" OR MIDWAY	COMMENTS
One 126 cases	69 (9 and 1)	3 9) ¹ (3 and 1 ²)	38 3) ¹ 1 ²	3	¹ One period. ² Either but not both.
One or two 26 cases	8	or	8 ¹ 2 or	2 ¹	¹ One or both. ² Occasionally. ³ Sometimes.
	2		2 ²	5	
	5 ³				
	1	1 ²	1		
	3 ⁴	1 ²			
	1 ¹		1		
	1 ²		1		
Two 89 cases	57 10 and 5 ¹ 5 and (1 and	and 10 2 and 2 (1) ² and	57 2 5 ¹ and 1 2 and	5 2 2	¹ Both. ² One period.
Two or three 18 cases	4 1 1 1 1 1 1 1 1 ² 1 ³		4 1 1 1 ¹ 1 ¹ 1 1 ¹ 1 ¹ 1 ³	1 1 1 ¹	¹ Sometimes. ² Usually. ³ Rarely. ⁴ And sometimes a week later. ⁵ No time given.
	1 ⁶	1 ¹	1 ⁵	1	⁶ Two or three times the week before.
Three 2 cases	2	2	2		
Three or four 2 cases	2	2	2		
Four 4 cases	2 ¹ 1 1		2 ¹ 1 ² 1	2 ¹ 1 ³	¹ Weekly. ² Others a few days apart. ³ One or two between.
Four or five 2 cases	1 ¹	1 ¹	1 ¹		¹ Beginning before, then four or five days apart.
	1 ²	1 ²	1 ²		² From a day or two before to a day or two after.
"Several" 2 cases			1 ¹ 1 ²		¹ All in the week or ten days following. ² Usually all before but occasionally after.

TABLE IV—CONT'D
PERIODICITY OF DESIRE WITH REFERENCE TO THE MENSTRUAL PERIOD

NUMBER OF PERIODS	BEFORE	DURING	AFTER	"BETWEEN" OR MIDWAY	COMMENTS
"Many" ¹¹					¹ Several days apart throughout the month.
Total 272					
Number of times mentioned	205	46	152	20	

For purposes of comparison, Table IV is arranged to show the comparative frequency with which "before," "after," "during," or "midway" is given as a period of desire in our 272 cases.

Where, for example, 8 is given in both the columns headed "before" and "after," and connected by the word "or" is meant that 8 women reply that they experience one or two periods of desire sometimes before and sometimes after the menstrual period. Where the figures are placed in two columns and connected by the word "and," it means that two periods are regularly observed in such relationships, etc., etc.

Adding the columns we find that 205 women mention "before" as the only period, or one of two or more periods observed, 46 mention "during" in the same way, while 152 give "after," and 20 "midway" as the only period, or one of two or more periods at which a regular wave of desire occurs. The proportion "before" to "after" is about 4 to 3.

Table III shows that in addition to the 272 women who recognize regular periods of desire, there were 298 who while observing certain periods of desire did not find them recurring regularly at the same time month after month.

In other words, desire occurred at "less regular intervals." In this group there were 201 women who placed their desire with reference to the menstrual period. Of these 166 women stated that they were sometimes conscious of desire but not each month. When it did come it preceded menstruation in 93 cases and followed in 40. Thirteen others said "one or two," 20 said "two" and 2 sometimes experienced from one to three such periods.

Table V presents these cases in the same manner as Table IV.

It will be observed that, taking this group as a whole, about twice as many noted the feeling as preceding the menstrual period than as following it, a proportion very much larger than that of the group exhibiting regular monthly periodicity, which as has been said was in the ratio of 4 to 3.

From the group recognizing regular monthly periodicity, we have selected for special study a group of 110 cases where the observed

TABLE V

RELATION OF DESIRE TO MENSTRUAL PERIOD OF THOSE WHO DO NOT RECOGNIZE
MONTHLY PERIODICITY

	BEFORE	DURING	AFTER	"BETWEEN" OR MIDWAY	COMMENTS
Observe one period of desire but not regularly every month. 166 cases	93 9	19 or	40 91	5	¹ Either but not both.
One or two periods but not regularly. 13 cases	9 or 2 or	91 2			¹ One or both in all this group.
May have two periods but not regularly. 20 cases	1 8 and 8	1 or or and	2 8	1	¹ Am not certain in these two groups. It may mean one period begun in one division and extending into next.
One to three periods. 2 cases	(and) 2 (or)	3 and (and) 2 (or)	31 21		
Total 201	133	44	64	7	

relation of desire to the menstrual period was stated so definitely as to make it possible to place it exactly. Of this group 59 individuals recognize one definite period of desire monthly, while 51 recognize two such periods.

Charts I and II give a graphic presentation of this data. In each chart the lunar month of twenty-eight days is represented by a large circle divided into 28 segments, one for each day. The menstrual period is fixed at the average of four days. "The week before" and "the week after" are indicated.

In Chart I the 59 small circles represent the dates given in the 59 cases of one period per month. When a statement reads "one week before," the circle is placed in the middle of the seventh segment preceding the one marked 1. If the statement reads "one or two days preceding," the circle is placed on the line dividing the appropriate segments. Where it says "the day before, lasting into the first day of the menstrual flow," two circles connected by a line indicate this condition, etc., etc.

In this group it will be noted that in all but two cases the wave of desire occurs in a period beginning with the first day of the week preceding and ending with the fourth day in the week following the menstrual period.

The group of cases presented in Chart II represents those who experience two periods of desire monthly which they place with definiteness. The same method of placement is used as in Chart I, but here

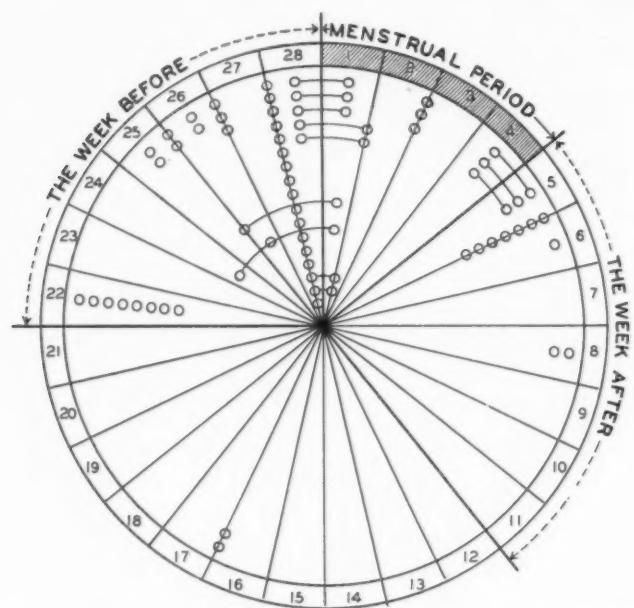


Chart I.—Frequency of sex desire. Fifty-nine cases with one period of desire monthly.

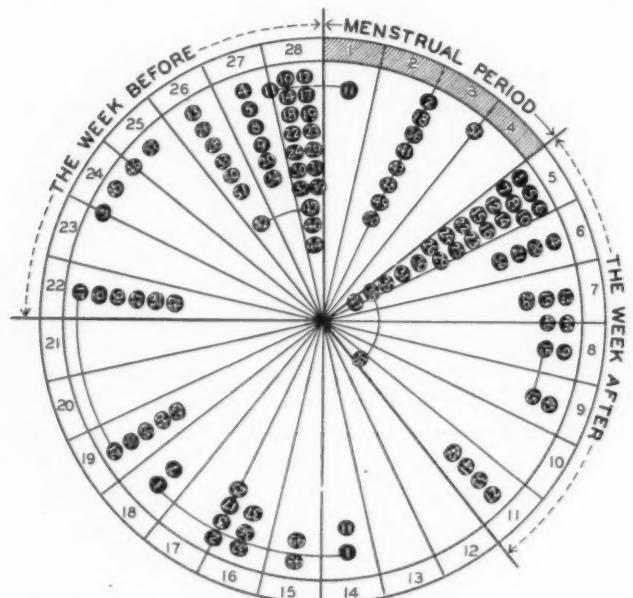


Chart II.—Frequency of sex desire. Fifty-one cases with two periods of desire monthly.

we have used black circles. The 51 cases are numbered consecutively, two circles for each case representing the two periods, e.g., Case 1 says: "Immediately following the menstrual period and from ten days to two weeks following that." Case 2 says: "Immediately fol-

lowing the menstrual period and two weeks later," etc., etc. An inspection of this chart shows only four segments free from circles.

Chart III combines the two groups, the white circles indicating the cases in group one and the black circles those in group two. On this chart only three segments are free from circles, those representing the 12th, 13th and 23rd days from the beginning of the menstrual flow. It would seem probable that with a larger group of cases, circles might

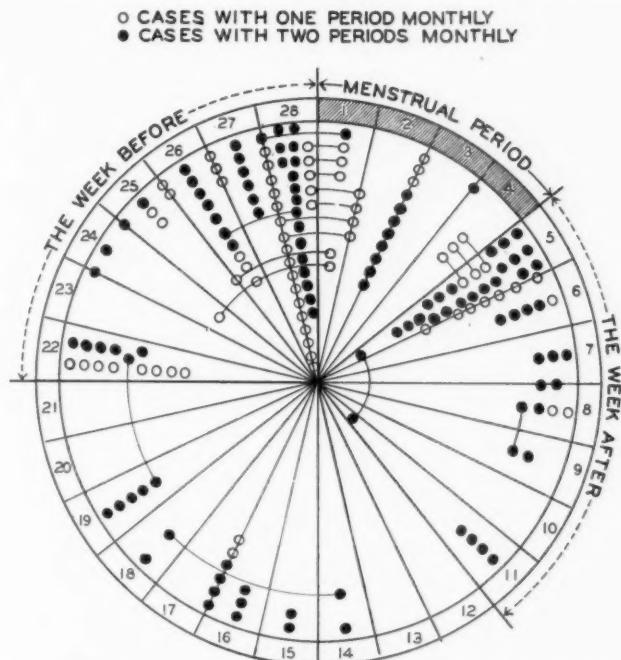


Chart III.—Frequency of sex desire. One hundred ten cases.

appear in these segments also, and thus show that on any day in the month there are individuals who experience sex desire.

Table VI summarizes the findings on Chart III.

It will be observed that the ratio of "before" to "after" is as 8 to 5. In the entire group of 272 the ratio was approximately 8 to 6 (4 to 3), while in the "irregular" group it was almost 8 to 4 (2 to 1).

TABLE VI
110 CASES WHERE PERIODICITY IS DEFINITELY PLACED

	BEFORE	DURING	AFTER	MIDWAY	COMMENTS
One period 59 cases	32 (9 and (9) ¹ (31 and (3)	3 (9) ¹ (31 and (3)	10	2	¹ One period
Two periods 51 cases	38 (1 and (1) ¹	9 (1) ¹	37	17	¹ One period
Total 110	80	25	50	19	

On the whole it would appear that for this particular group of cases the proportion of "before" is considerably greater than "after," but that so far as present studies go no more definite deductions are possible.

CORRELATIONS

In order to discover whether the group of 272 who recognize definite periods of desire differed in any further particulars from the other groups shown in Table VII, we have worked out several sets of correlations.*

TABLE VII

1. Unanswered as to sex feeling or desire (2 admit masturbation)	10
2. No sex feeling, desire or expression	124
3. Sex feeling and sex desire admitted	594
4. Sex feeling and sex desire with periodicity	272
	<hr/> 1000

1. Age. The first comparison made was that of age. No significant differences were found between the various groups.

2. First Remembrance of Sex Feelings.

A comparison of the figures shows that there was a significant difference between those who did and who did not recall sex feelings in childhood and the recognition of periodicity of desire as adults. Those who recalled sex feelings in childhood were more likely to report such recognition. It was also found that a significantly large proportion of those who do not recognize periodicity did not recognize sex feelings until after graduation from college.

3. Sex Problems of Childhood.

Our questionnaire contains a section devoted to sex problems of childhood, adolescence and adult life. Inasmuch as the group which recognizes periodicity contains a significantly higher percentage of those who remember sex feelings in childhood, a comparison as to childhood problems is of interest.

By two methods of estimating, this comparison shows that a significantly larger proportion of those who recall sex problems of childhood are in the group which has *not* observed regular periodicity.

4. Present Sex Problems.

The reverse is true, if we examine present problems. More than one-half, i.e., 55.9 per cent of those who recognize periodicity have present sex problems, while this is true in the case of only 43.8 per cent of those who do not. The difference is large enough to be certainly significant.

5. Sex Experiences.

(a) Masturbation.

In the group which admits the practice of masturbation earlier in

life but has stopped the practice, there is no significant difference between those who recognize periodicity of desire and those who do not. It is otherwise with both those who state that they have never practiced it and those who admit the practice at present.

Of the 272 who recognize periodicity, only 16 per cent say they never masturbated, while 50 per cent admit the continuation of the practice; on the other hand, of the group that has never recognized periodicity, 42 per cent never practiced, while 26 per cent only practice at time of reply.

(b) Homosexual and heterosexual expression.

In both of these particulars the percentage differences and the number in each group are too small to be significant.

6. Health.

General health is of so great importance in the life of every woman that a correlation was made of the periodicity of desire and the state of health of the individual at the time of replying to the questionnaire.

That the women generally recognize the importance of this question is shown by the fact that only one out of the entire 1000 failed to answer. A study of the members in the respective groups, whose health at the time of answering the questionnaire was good or excellent, shows that the highest percentage is in the group of 124 individuals who deny all sex feeling and experience. The group which comes next, with so small a percentage of difference as to be negligible, is that in which the individuals recognize periodicity of desire. The group which has sex feeling but no recognition of periodicity is significantly below that which recognizes periodicity in the percentage of good and excellent health. No other percentage differences are valid.

7. Nervous Breakdowns.

So-called nervous breakdowns must be the result of pathologic physical or mental conditions, or both. Under health one of the questions asked was "Have you ever had a nervous breakdown?"

Out of the total of 1000 women all but 6 answered this question. One hundred and ninety-six had had a breakdown, while 104 had "almost" or "nearly" reached that point. This together amounts to 30 per cent of the entire 1000.

If we compare the group which admit sex feeling or experience either with or without recognition of periodicity with the group which admits no sex feeling or experience, we find that the percentage of nervous breakdowns is sufficiently higher in the latter group to be certainly significant and not therefore the result of chance sampling.

Between the groups which do and do not recognize periodicity, there is no valid difference.

8. Happiness.

Happiness is a purely subjective matter. It is a state of mind conditioned by a large number of factors. In most cases it has a good deal to do with efficiency,—no one denies its importance, no one has ever devised a quantitative or qualitative measurement of happiness to be applied from without.

A tabulation has been made showing how the women in the groups under consideration rate themselves.

In a questionnaire study it is impossible to go back of the statements of the persons replying. In this present study the question was put as follows:

**"Do you consider your life as a whole (a) happy, (b) unhappy?
In either case why?"**

The highest percentage of happiness is found in the group which deny all sex feeling or experience. Next to this, and not significantly below it, comes the group with sex feelings but no observation of periodicity. The lowest percentage of happiness is in the group which recognizes periodicity, and this is sufficiently lower than that in the other two groups to be certainly significant in both cases.

CONCLUSION

Any interpretation of the data presented in this paper would be unscientific with only the group at hand which represents in its composition an approximately homogeneous class of women. The writer will therefore refrain, as in preceding papers, from any conclusions.

A following paper will present what material we have on the same topic taken from the questionnaires for married women. Owing, in part at least, to the form of the questions we have fewer replies and less definite information from this group. It seems wise, however, to give all we have on the subject.

REFERENCES

- ¹For the method of conducting the study, see our previous reports published in the *Journal of Social Hygiene*, April 1922, January 1923, March 1923, and *Mental Hygiene*, July 1924, January 1925.
- ²A Study of Certain Auto-Erotic Practices, *Mental Hygiene*, July, 1924, January, 1925.
- ³Howell, W. H.: *Textbook of Physiology*. Philadelphia and London, W. B. Saunders Company, ed. 5, 1913, p. 949.
- ⁴Marshall, Francis Hugh Adams: *The Physiology of Reproduction*, New York, Longmans, Green & Co., 1922, p. 138.
- ⁵Ellis, Havelock: *Studies in the Psychology of Sex*. Vol. I. Philadelphia, F. A. Davis Company, ed. 3, 1923, p. 103.
- ⁶Loc. cit.: p. 104.
- ⁷Stopes, Marie Carmichael: *Married Love, A New Contribution to Sex Difficulties*, London, G. P. Putnam's Sons, ed. 12, 1923, p. 68, Chart I.
- ⁸A detailed discussion of these correlations together with the supporting tables will be found in the reprint. The method of comparison is that used in previous studies. See a Study of Certain Auto-Erotic Practices, *Mental Hygiene*, July, 1924, viii, No. 3, p. 878.

THE EFFECT OF TREATMENT OF THE SYPHILITIC PREGNANT WOMAN UPON THE INCIDENCE OF CONGENITAL SYPHILIS*

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(*Contribution from the Evans Memorial*)

THE development of the dispensary clinic with its early diagnosis and prompt treatment has diminished the spread of syphilis from a public health standpoint by shortening the infectious period and by reducing the number of patients capable of transmitting syphilis. However, its suppression must depend upon more extensive measures for the removal of the sources of infection. An important means of combating the spread of this disease is the treatment of congenital syphilis, which is accomplished not only by the treatment of the syphilitic child after birth, but also indirectly by the treatment of the syphilitic pregnant woman.

Although opinions differ as to its efficacy, the treatment of children with congenital syphilis is generally considered inadequate inasmuch as it is limited to the children who survive the first few weeks of life. On the other hand, since antenatal treatment of the mother during the gestation period not only affords an opportunity for treatment of the child in utero and serves as a prophylactic measure against infection of the child, but also renders the mother noninfective to future offspring, it appears to be the most practical means of attacking the problem of congenital syphilis. The efficacy of this method of treating congenital syphilis as measured by the production of healthy living children is confirmed by numerous reports in medical literature. Since few of these reports have submitted a control series of untreated syphilitic women, it is my purpose to present a statistical survey of one hundred and ninety women with positive Wassermann reactions, of whom forty had received treatment during the gestation period, and to point out some of the factors which, independent of treatment, influence the results. Before interpreting these figures, it is necessary to consider the method of infecting the offspring, the ways in which syphilis injures the child, and the variable factors which render the statistics upon congenital syphilis confusing.

TRANSMISSION OF CONGENITAL SYPHILIS

Not infrequently one partner of a marriage is nonsyphilitic and the other syphilitic. The type and duration of the disease, the organs chiefly affected, and the treatment previous to marriage determine the incidence of transmission between husband and wife. The occasional instances of apparently symptomless and serum-negative mothers of syph-

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ilitic children cannot be explained by the factors which determine the absence of conjugal syphilis. Although the possibility of the paternal transmission without maternal infection offers a fertile field for speculation, it is more reasonable to assume that every child with congenital syphilis has a syphilitic mother and that the serum-negative mother with no clinical symptoms has an unrecognized syphilitic infection.

The so-called congenital syphilitic child may acquire the disease during the antenatal, intranatal, or postnatal period. In the last instance, syphilis acquired after birth is classified erroneously as congenital. Syphilis may be acquired by the child during labor if the parturient canal is infected with the treponema. Most children with congenital syphilis become infected during the antenatal period. The mother may be infected before or during pregnancy. The time of infection and the element of chance determine in no small measure the incidence of congenital syphilis. Exacerbation of the disease, local infection of the reproductive tract, abnormalities which lower the protective powers of the fetus, and changes in the resistance of the mother are among the factors which determine whether the child be syphilitic or healthy.

Previous to Conception.—The greater the interval between the infection and conception, the smaller are the chances of infecting the child. Women in whom the disease has been recently active give the highest incidence of infected children. In untreated persons acquired syphilis tends to become latent, though retrogression is irregular. Exacerbations of the disease and temporary alterations in individual immunity may result in an irregular distribution of healthy and syphilitic children in the same mother. With these exceptions it may be stated that women who show no clinical evidence of syphilis and who have had the disease over five years seldom give birth to a syphilitic child. The syphilitic population of maternity hospitals is composed largely of such women.

During Pregnancy.—The critical period of infection is just previous to conception and during the first five months of pregnancy. Syphilis acquired by the mother during the last months of pregnancy is less likely to result in intrauterine infection, especially after the seventh month, but occasionally is transmitted by the intranatal or postnatal route. The possibility that the ovum may be infected at conception and subsequently may infect the mother must also be considered. Clinical experience and experimental work in animals indicate that pregnancy alters the clinical course of syphilis. The state of pregnancy may serve as a protective function which alters the ordinary course of the conflict between host and disease.

INJURIOUS EFFECTS OF SYPHILIS

In order to record the effect of antenatal treatment, it is necessary to know the injurious effects of syphilis upon the child. Syphilis may manifest itself in fetal deaths, premature births, children dying soon

after birth, and in living syphilitic children. Its general effect is to lower the productive power as measured by the ratio of living children to total conceptions. The percentage of living births and the survival of these children are noticeably lower in women with serum-positive syphilis than in nonsyphilitic women. A strongly positive Wassermann reaction, recent syphilis and clinical symptoms increase the destructive effect.

Fetal Deaths.—The surprisingly small rôle played by syphilis in the totality of fetal deaths is due to the difficulty of determining accurately its action, its relative infrequency, and the fact that its maximum activity is not evident until the later months of pregnancy. Our statistics indicate that about 15 per cent of women who give a history of abortions or stillbirths have a positive Wassermann reaction, and that one-third of all fetal deaths in serum-positive syphilitic women and two-thirds in women with clinical syphilis are due to syphilis. Certain races, as the Negro, have a higher percentage of syphilitic fetal deaths.

Since the action of syphilis is practically confined to the later months of pregnancy, a record of stillbirths in maternity hospitals affords considerable information as to the effect of syphilis. However, the abnormal proportion of difficult or complicated cases which require hospital care lowers the per cent due to syphilis. In a series of nearly five hundred serum-positive syphilitic women, two-fifths of the hospital stillbirths were due to syphilis.

Early Deaths.—Since syphilis tends to produce weak or premature children, the combined statistics of stillbirths and children dying within two weeks are more representative of its effect than stillbirths alone. According to our statistics, 1.47 times as many fatalities occur in children of serum-positive syphilitic women as in those of nonsyphilitic and 3.87 times as many in those of clinically syphilitic women.

The cause of fetal and early death may be grouped under mechanism of labor, $\frac{1}{6}$ (suffocation, dystocia, and placental abnormalities); condition of mother, $\frac{1}{12}$; condition of the child, $\frac{1}{4}$ (prematurity, inanition, debility, and deformity in some instances indirectly due to syphilis); recognizable syphilis and macerated fetuses, $\frac{1}{4}$; and various and unknown causes, $\frac{1}{4}$. Syphilis often produces a macerated fetus but other conditions may accomplish the same result and the designation of syphilitic should not be applied without morphologic evidence of the disease or the presence of treponema. The similarity of causes of fetal deaths in syphilitic and nonsyphilitic women indicates that syphilis may act indirectly by lowering the general resistance, thus rendering the fetus susceptible to conditions otherwise insufficient to produce death.

Effect on Child.—The general effect of maternal syphilis upon the child may be roughly obtained by a follow-up record of the children of syphilitic women. Such surveys as a rule furnish only minimum

figures as to the effect of syphilis. The majority of women with positive Wassermann reactions during pregnancy have inactive old syphilis. Nonsyphilitic individuals may be included through technical errors and it is impossible even with a careful physical examination to exclude the presence of syphilis in the apparently healthy children. In a series of 374 untreated serum-positive women about 66 per cent of the children were apparently healthy and free from syphilis.

VARIABLES INFLUENCING STATISTICS UPON CONGENITAL SYPHILIS

The statistical discrepancies as to the effect of syphilis upon the child are the result of certain variable factors. For example, the incidence of congenital syphilis is quite different in the children of women who have only a positive Wassermann reaction and in those of women who show in addition clinical evidence of syphilis. The Wassermann reaction in the pregnant woman presents certain peculiarities and active syphilis in the mother produces a greater effect on the offspring than latent syphilis. Obviously, it is unfair to compare statistics based on clinical findings with those based upon the Wassermann reaction. An adequate comparison between two groups of women with positive Wassermann reactions requires that they have a similar composition as to race and marital history, clinical syphilis, duration of the disease, and previous treatment.

Wassermann Reaction.—Opinions vary as to the reliability of the Wassermann reaction during pregnancy, but these irregularities are chiefly the result of technical procedures, prominent among which are the type of antigen and the method of handling the serum. Cholesterolized antigens give different results from noncholesterolized antigens, particularly with pregnant women. When no special care is taken in handling the serum, anticomplementary and even nonsyphilitic fixation substances may develop in the serum, which in pregnant women seems to possess an instability that renders it more susceptible than ordinary serum to abnormal conditions of handling. Owing to technical irregularities, a group of women with positive Wassermann reactions may include a certain number of nonsyphilitic women and may not be comparable to a group of clinically syphilitic women. Unless tests were made with the same antigen and with the same methods of handling the sera, even two groups of women with positive reactions would not be comparable.

Clinical Syphilis.—The presence of a positive Wassermann reaction in pregnant women may indicate a nonsyphilitic condition due to a false reaction, old "cured" syphilis of inactive type, treated syphilis, and symptomless syphilis. Only the last class, representing an infection with no external manifestation, is especially dangerous to the offspring. Therefore, syphilis should have less effect upon the children of serum-positive women than upon those of women with clinical evi-

dence of syphilis. The type of clinical syphilis determines in a large measure the effect upon the offspring. Recent syphilis tends to give more disastrous results than old; florid syphilis is more serious than inactive; untreated is more dangerous than treated; syphilis in non-resistant women has more effect on the child than syphilis in resistant women; and syphilis in certain races tends to exact a greater toll upon the children. By unconsciously attributing the serious effect of recent active maternal syphilis in the child to all stages of syphilis, both the damage from this disease and the beneficial effects of treatment have been exaggerated.

TREATMENT OF THE SYPHILITIC PREGNANT WOMAN

If allowance is made for the factors which influence the transmission of congenital syphilis, the effect of antenatal treatment of the mother may be observed by comparing groups of untreated and treated women. Our statistics are based upon women who presented either a strongly positive Wassermann reaction with a cholesterolized antigen during pregnancy or, in addition, clinical evidence of syphilis. Follow-up records on the children between the ages of one and four years are presented for forty women who had received antisyphilitic treatment before delivery and for one hundred and fifty who had received practically no treatment. Both groups, more particularly the untreated, may contain some nonsyphilitic women, since many Wassermann reactions previously positive were found to be negative at the time of the survey, although the subsequent negative reaction may be due in part to the lapse of time, the absence of pregnancy, and anti-syphilitic treatment. The small number of women who received adequate treatment previous to delivery is explained by the fact that many women did not report for prenatal examination sufficiently early to permit adequate treatment and that at the time these statistics were taken, 1916 to 1919, the present methods of thorough prenatal syphilitic treatment were not in vogue.

Before a fair comparison of the effect of treatment can be made, it is necessary to determine whether the two groups of patients are similar in other respects than possessing a positive Wassermann reaction.

Clinical Syphilis.—In Table I the two groups have been divided from the standpoint of clinical syphilis into four classes: (A) *definite*, when there is no question of the clinical diagnosis; (B) *suspicious*, when there are several suggestive symptoms but the evidence is not conclusive; (C) *suggestive*, when a single symptom or sign of the disease is present; and (D) *no indication*, when no clinical evidence can be obtained. A relatively small proportion of women with serum-positive syphilis give clinical evidence of the disease in prenatal clinics. The number of women with clinical syphilis is greater in these groups than

usually noted in our prenatal clinic since a special effort has been made to obtain additional evidence through the family. As a rule, multiparae present more clinical evidence of syphilis than primiparae, but since the proportion of multiparae is approximately the same in both groups, it does not affect either the clinical classification or later the results with the present child.

TABLE I
CLINICAL CLASSIFICATION

CLINICAL SYPHILIS	NEGATIVE	POSITIVE		
		UNTREATED	TREATED	TOTAL
Number of patients	500	150	40	190
Multiparae	277	106	26	132
Primiparae	223	44	14	58
A. Definite	0.2%	24%	37.5%	26.3%
B. Suspicious	11.8	34	30.0	33.2
C. Suggestive	30.0	24	15.0	22.1
D. No Indication	58.0	18	17.5	18.4

Arbitrarily the A and B classes are taken as indicating clinical syphilis irrespective of the actual type or stage of the disease. Patients with clinical syphilis form 58 per cent of the untreated group and 67.5 per cent of the treated. If the evidence obtained from the child of the present pregnancy is excluded, the difference is more pronounced, 36 per cent and 60 per cent respectively. Also the disease had existed over five years in 42.5 per cent of the untreated women as compared with 30.0 per cent of the treated. Since the treated group evidently is more severely afflicted with syphilis, it is not comparable clinically with the untreated.

Previous Children.—In multiparae the results of previous conceptions give additional information as to the severity of the infection. Our statistics indicate that over one-half the fetal deaths in these patients were the result of syphilis. Table II shows the severe effect of syphilis in the treated group in respect to fetal deaths and dead children. The influence of clinical syphilis is particularly evident in the untreated group in which forty-three serum-positive multiparae had a previous history of 16 per cent of fetal deaths as compared with 44.3 per cent for sixty-three multiparae who once had clinical symptoms of syphilis. In the treated group little difference was observed between the serum-positive and clinically positive women who gave 50 and 53 per cent of fetal deaths respectively. This difference suggests that possibly some of the patients without clinical symptoms in the untreated group were nonsyphilitic.

The treated group comprised a larger proportion of clinically syphilitic and more recently infected women than the untreated group, and these women had suffered more damage with their previous children. If both groups had remained untreated, it would be natural to

TABLE II
PREVIOUS CHILDREN

	NEGATIVE	POSITIVE		
		UNTREATED	TREATED	TOTAL
Number of multiparae	277	106	26	132
Number of conceptions	610	281	58	339
Per cent fetal deaths	19.5	34.2	51.7	37.2
Per cent dead children	10.8	12.1	19.0	13.3
Per cent living children	69.7	53.7	29.3	49.5

expect that the unfavorable results in the present child would be more marked in the treated group. According to present standards the treated patients received insufficient prenatal treatment, approximately six injections of arsphenamine and twelve of mercury. In comparing the two groups, due allowance must be made for these differences. The eighty-seven women of the untreated group who had clinical evidence of syphilis perhaps more nearly represent the average effect of untreated syphilis. For this reason, our results for the untreated control group are expressed for both clinical and serum-positive women.

TABLE III
PRESENT CHILD

	NON-SYPHILITIC WOMEN	SYPHILITIC WOMEN			
		UNTREATED			TREATED
		CLINICAL	NON-CLINICAL	TOTAL	
Total conceptions	492	87	63	150	40
Dead children					
Per cent					
Fetal deaths	3.7	23.0	7.9	16.7	5.0
Dying in Hospital	2.6	6.9	1.6	4.7	7.5
Dying after Hospital		15.0	3.1	10.0	
Total		44.9	12.6	31.4	27.5
Living children					
Per cent					
Syphilitic		12.7	0.0	7.3	5.0
Nonsyphilitic		42.4	87.4	61.3	67.5
Total		55.1	87.4	68.6	72.5

Present Child.—In the untreated and treated groups in Table III 61.3 per cent and 67.5 per cent respectively of the conceptions resulted in nonsyphilitic children,—a slight increase in favor of the treated group. This observation applies only to children from one to four years of age showing no evidence of early syphilis and naturally the percentage may include children who later may show evidence of the

disease. In 87 untreated women with clinical syphilis 42.4 per cent of the conceptions terminated in apparently healthy children as compared with 87.4 per cent in 63 serum-positive women. The difference is similar but less marked, 49 and 68 per cent respectively, when the clinical classification does not include evidence in the present child. In the untreated group 47.6 per cent of the conceptions in 44 primiparae produced nonsyphilitic living children and in 106 multiparae 67 per cent, indicating that other factors than syphilis tend to increase the mortality in primiparae. Primiparae also give a greater proportion of stillbirths than multiparae. The damaging effect of recent untreated syphilis is illustrated by the fact that in 105 women with syphilis of less than five years' duration, living nonsyphilitic children were obtained in 56 per cent of the conceptions in contrast to 73 per cent in 45 women with syphilis of over five years' duration.

The treated group showed fewer fetal deaths, 5 per cent, than the untreated group, 16.7 per cent, the highest percentage, 23 per cent, occurring in the clinical section of the untreated group. By its tendency to produce premature birth and faulty development, syphilis increases the number of children dying shortly after birth, particularly within the first two weeks. Our treated group showed a greater proportion of such accidents than the untreated and the non-syphilitic groups, but the combined total of fetal deaths and deaths during the first two weeks of life was but slightly over one-half that of the untreated group. The death rate after leaving the hospital was practically the same in the untreated women with clinical syphilis and the treated women, approximating the normal death rate, which was 15.1 per cent, for children less than one year old in the registration area during this period. The low death rate for the serum-positive untreated women is probably due to statistical variation.

DISCUSSION

These somewhat meager statistics indicate that a large proportion of the children born of untreated syphilitic women never develop syphilis. The transmission of congenital syphilis depends upon the type and duration of the disease in the untreated mother, upon her resistance, and to a limited extent upon the element of chance. At least some of the excellent results attributed to antisyphilitic treatment in the literature would have been obtained without treatment if the investigation had been controlled by a series of untreated patients. The results of antisyphilitic treatment, which are so effective in recent active syphilis, cannot be interpreted in the same manner in old or latent syphilis, which is less frequently transmitted from mother to child.

In recent active syphilis, treatment is absolutely necessary to prevent infection of the child. In old or obscure syphilis there is always

the possibility of transmission and, therefore, it is essential that treatment be instituted in every pregnant woman with a diagnosis of syphilis. Treatment of the pregnant woman should be begun early, should be thorough, and should be continued up to the time of delivery.

SUMMARY

A survey of the children of untreated women who had a positive Wassermann reaction during pregnancy indicated that the majority of these children showed no evidence of early congenital syphilis. In 150 serum-positive women who received no treatment during pregnancy 61.3 per cent of the conceptions resulted in living, apparently nonsyphilitic children; in 87, who in addition showed evidence of clinical syphilis, 42.4 per cent; and in 63 who had only serum-positive syphilis 87.4 per cent. Women who showed no clinical evidence of syphilis and who had had the disease over five years seldom gave birth to a syphilitic child.

A group of 40 women who resembled most closely the 87 untreated women with clinical syphilis in respect to the previous effect of the disease received antisyphilitic treatment during the gestation period. Living, apparently nonsyphilitic children resulted in 67.5 per cent of the conceptions. The most striking evidence of the effect of treatment was the lowering of the fetal death rate.

(For discussion see page 898.)

PLACENTAL TRANSMISSION

IV. THE PROTEIN FRACTIONS IN FETAL AND MATERNAL PLASMA

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AN INTEREST in the general subject of placental transmission has led us to investigate the relation between the concentrations of the various protein fractions in the fetal plasma as compared with those obtaining in the maternal plasma at the time of parturition. This interest was accentuated by the fact that we have shown recently that the amino-acids are constantly higher in the fetal whole blood and plasma than in the maternal.¹

Previous workers,—Landsberg,² Zangemeister and Meissl,³ Alder,⁴ and Bauereisen⁵—have demonstrated that the total proteins are higher in the plasma and serum of the newborn than in the mother; while others —Utheim,⁶ Lederer,⁷ and Boyd⁸—have shown that newborn infants and very young children have a lower plasma or serum protein content than older children and normal adults. Landsberg² has also shown by actual analysis that the plasma of the newborn child has a lower fibrinogen (fibrin) content than that of its mother, and the same conclusion was

reached by Krüger⁹ and Seherenziss¹⁰ upon the basis of determinations of the fibrin in fetal plasma as compared with the published figures for that in normal adults. Kollmann¹¹ found identical values in the mother and child in one case of eclampsia,—0.75 per cent in each. Duzár and Rusznyák¹² report that the fibrin content of the blood and plasma of young children is below the commonly accepted normal.

The albumin and globulin fractions have been less studied, but Duzár and Rusznyák¹² say that, "The blood of a newborn babe is . . . , rich in globulin and total albumin;"; and Alder⁴ maintains that placental serum contains, as a rule, less protein and a higher proportion of albumin than adult blood. Lewis and Wells¹³ fractionated the globulins in the blood of several normal adults and in a few specimens of cord blood, and found that, "the newborn human infant is virtually devoid of euglobulin in its blood serum, although it has quite as much serum albumin and about the same quantity of pseudoglobulin as the adult." Howe¹⁴ has shown that newborn calves have neither euglobulin nor pseudoglobulin I in the blood, but that these substances make their appearance a few hours after birth if the animal obtains colostrum from its mother, or more slowly if it is fed milk from a cow which has been lactating for some months. Colostrum is particularly rich in euglobulin.

In a recent communication,¹⁵ we have stressed the fact that the values for the various plasma protein fractions available in the literature are too different to be of much consequence, and that such figures are comparable only when the analyses have been done by the same method. A similar divergence of opinion exists as to what changes are produced by pregnancy in the normal individual. Our own determinations¹⁵ indicate that gestation causes a lowering of the total protein which is due to a diminution in the serum albumin, with the serum globulin showing no distinct alteration, and the fibrin rising from early in pregnancy to a high point on the third day after delivery.

METHODS

The blood specimens were collected into test tubes containing 35 milligrams of powdered potassium oxalate; the maternal specimen from an arm vein and the fetal from the free cut maternal end of the umbilical cord immediately after the birth of the child. From 10 to 15 cubic centimeters of blood were taken in each instance so that the proportion of oxalate was fairly constant. No attention was paid to the time of the last meal either in the parturient women or in the normal nonpregnant individuals, since Alder⁴ has shown that food intake has little or no effect upon the protein composition of the blood. Care was taken to have a minimal amount of venous stasis. All specimens showing any clotting or any considerable degree of hemolysis were discarded. It is extremely difficult by this simple

method to obtain fetal plasma which is perfectly clear, but we convinced ourselves that a small amount of hemoglobin has no appreciable effect upon the results. After centrifugalizing the specimens for twenty minutes at 2500 to 3000 r.p.m., the supernatant plasma was removed and analyzed by the method of Wu,¹⁶ which was followed without change. All bloods were collected only during the day when analysis could be begun at once.

RESULTS

Table I gives the values obtained in 15 normal, nonpregnant, young women which may serve for comparison with the fetal and maternal figures which form the chief part of this communication.

TABLE I
THE PLASMA PROTEIN FRACTIONS IN NORMAL NONPREGNANT WOMEN

CASE NO.	PLASMA VOLUME %	TOTAL PROTEIN %	ALBUMIN %	GLOBULIN %	PLASMA FIBRIN %	W. B. FIBRIN %	REMARKS
2	64.6	7.78	5.02	2.39	0.37	0.24	15 days after period
33	65.4	6.96	4.06	2.65	0.25	0.16	2nd day of period
43	74.1	7.21	4.45	2.32	0.34	0.25	1st day of period
112	68.9	7.63	4.40	2.92	0.31	0.21	20 days after period
113	66.3	7.74	4.66	2.77	0.31	0.21	4th day of period
114	67.1	7.58	4.35	2.95	0.28	0.19	7 days after period
115	66.4	7.04	4.23	2.57	0.24	0.16	20 days after period
124	66.1	7.50	4.18	2.92	0.40	0.26	3rd day of period
126	67.7	7.60	4.30	3.07	0.23	0.16	23 days after period
133	61.7	7.73	4.53	2.87	0.33	0.20	26 days after period
138	62.5	7.35	4.45	2.60	0.30	0.19	27 days after period
178	60.0	7.08	4.33	2.44	0.31	0.19	4th day of period
346	66.9	7.26	4.51	2.39	0.36	0.24	28 days after period
359	65.1	7.61	4.33	3.00	0.28	0.18	14 days after period
379	62.5	7.32	4.56	2.47	0.29	0.18	16 days after period
Aver.	65.7	7.42	4.42	2.69	0.31	0.20	

The average value for total plasma protein,—7.42 per cent,—compares well with that previously reported by Plass and Bogert¹⁷ for 22 normal nonpregnant women,—7.04 per cent. Our experience is that the Wu method generally gives values slightly higher than those obtained by the older Kjeldahl procedure. There does not seem to be any definite relation between the total plasma protein content and the menstrual cycle. The albumin and globulin figures correspond well with those generally given but the former is somewhat lower and the latter somewhat higher than those of Coetzee¹⁸ and Wu.¹⁶ The fibrin values compare well with those of other investigators. It would appear that the fibrin tends to be somewhat higher at or about the menstrual period, as suggested by Frisch and Starlinger,¹⁹ although more extensive work would be necessary to establish this point. Such an observation agrees well with that of Löhr²⁰ and others that during menstruation the suspension-stability of the blood is

appreciably diminished. It has already been established by Gram²¹ that women generally have a higher plasma fibrin than men.

Table II gives the total protein values obtained in 15 samples of fetal and maternal plasma.

TABLE II
THE TOTAL PROTEINS IN FETAL AND MATERNAL PLASMA
(VALUES IN GRAMS PER 100 C.C.)

CASE NO.	FETAL	MATERNAL	CASE NO.	FETAL	MATERNAL
1	6.37	7.43	9	6.75	7.30
2	5.60	6.70	10	5.56	7.52
3	5.67	7.22	11	6.03	6.45
4	6.42	7.27	12	6.12	6.91
5	6.97	7.02	13	6.34	7.66
6	6.26	7.13	14	6.61	7.98
7	6.00	6.60	15	6.66	7.62
8	5.40	7.01	Average	6.18	7.18

The total plasma protein was consistently higher in the child than in the mother, the range of difference being from 0.05 to 1.96 per cent and the average variation 1.00 per cent. Corresponding figures from other sources follow:

	FETAL		MATERNAL		AVERAGE DIFFERENCE
	NO. OF CASES	PROTEIN PER CENT	NO. OF CASES	PROTEIN PER CENT	
Zangemeister and Meissl ²	7	5.16	7	6.79	1.63
Landsberg ²	6	5.05	6	6.57	1.52
Bauereisen ⁵	15	5.80	7	6.84	1.04

The maternal values at the end of labor are thus seen to be slightly below those previously given for normal, nonpregnant, young women. The fetal values are, however, more markedly depressed. Utheim⁶ and Lederer⁷ have recorded average values of 4.84 and 5.07 per cent for the plasma proteins in premature infants, so that it appears that the protein content of the plasma varies somewhat with the period of intrauterine development. We were, however, unable to detect any relationship between the plasma protein concentrations in the mature infants we studied and their birth weights.

Table III records the serum albumin values obtained in the 15 cases studied.

TABLE III
THE SERUM ALBUMIN IN FETAL AND MATERNAL PLASMA
(VALUES IN GRAMS PER 100 C.C.)

CASE NO.	FETAL	MATERNAL	CASE NO.	FETAL	MATERNAL
1	4.20	4.20	9	4.10	4.28
2	3.35	4.10	10	3.44	3.96
3	2.97	3.74	11	3.51	3.71
4	3.58	4.01	12	3.80	4.10
5	4.09	3.97	13	3.77	4.09
6	3.71	3.94	14	3.97	4.51
7	3.64	3.96	15	3.97	4.53
8	3.32	3.56	Average	3.69	4.04

The average albumin content of fetal plasma is somewhat lower than that of maternal plasma (3.69 per cent against 4.04 per cent), but the individual samples are not absolutely consistent in this respect, for in one instance the maternal specimen is slightly lower and in another the two samples are equal in albumin content. Possibly these variations were due to unintentional stasis in the cord blood resulting from compression of the vessels even before the birth of the child.

Alder⁴ seems to have found the fetal serum high in albumin since he reports that it represents 77.1 per cent of the total protein in 21 placental blood samples as against 69.0 per cent in 24 normal women, although it may have been that the relative value only was increased, for he found the total proteins lower in the placental specimens than in normal adults. Boyd⁸ reports the average albumin in the serum from cord blood as 2.60 per cent (using her nitrogen values and a conversion factor of 6.25), and the average globulin as 2.14 per cent, the albumin thus representing 55 per cent of the total protein.

Table IV gives our serum globulin values.

TABLE IV
THE SERUM GLOBULIN IN FETAL AND MATERNAL PLASMA

CASE NO.	FETAL	MATERNAL	CASE NO.	FETAL	MATERNAL
1	1.86	2.62	9	2.39	2.57
2	1.99	2.24	10	1.84	3.15
3	2.49	3.10	11	2.29	2.32
4	2.49	2.77	12	2.09	2.49
5	2.60	2.72	13	2.32	3.05
6	2.29	2.67	14	2.39	3.07
7	2.07	2.29	15	2.29	2.62
8	1.84	2.95	Average	2.22	2.71

In every instance the globulin in the fetal plasma is less than in the maternal blood. The average difference is 0.49 per cent, while the extremes are 0.03 and 1.31 per cent. The maternal values are practically the same as those for normal, nonpregnant women, while in the newborn children the globulin is considerably lowered. This confirms Lewis and Wells,¹³ who found that adult blood serum averaged 3.60 per cent globulin as against 2.18 per cent for the serum obtained from cord blood, the latter value agreeing well with that here reported. Fähraeus²² says: “* * * the lowest globulin values are to be found in the newborn, where, as we have seen, the stability is greatest.” On the other hand, Duzár and Rusznyák¹² state that: “The blood of a newborn babe is * *, rich in globulin * *.”

Table V presents the fibrin (fibrinogen) values.

The average value for the fibrin at birth is only slightly lower than in normal adult women even though it is considerably lower than in the parturient woman. In every instance the difference is in this

TABLE V
THE FIBRIN IN FETAL AND MATERNAL PLASMA
(VALUES IN GRAMS PER 100 C.C.)

CASE NO.	FETAL	MATERNAL	CASE NO.	FETAL	MATERNAL
1	0.31	0.64	9	0.26	0.45
2	0.26	0.36	10	0.28	0.41
3	0.21	0.38	11	0.23	0.42
4	0.35	0.49	12	0.23	0.32
5	0.28	0.33	13	0.25	0.52
6	0.26	0.52	14	0.25	0.40
7	0.29	0.35	15	0.40	0.47
8	0.24	0.50	Average	0.27	0.44

direction. Landsberg² gives an average value of 0.24 per cent for the newborn as against a nonpregnant adult figure of 0.38 per cent; while Duzár and Rusznyák¹² say that: "The blood of a newborn babe is very low in fibrinogen * * *."

When the whole blood fibrin is calculated from the plasma fibrin values and the plasma volume per cent as recommended by Foster and Whipple²³ values represented in Table VI are obtained:

TABLE VI
THE FIBRIN IN FETAL AND MATERNAL WHOLE BLOOD

CASE NO.	PLASMA VOLUME		PLASMA FIBRIN		WHOLE BLOOD FIBRIN	
	Fetal %	Maternal %	Fetal %	Maternal %	Fetal %	Maternal %
1	50.0	67.3	0.31	0.64	0.15	0.43
2	55.3	62.0	0.26	0.36	0.14	0.22
3	50.6	64.0	0.21	0.38	0.11	0.24
4	51.3	62.0	0.35	0.49	0.18	0.30
5	48.0	68.3	0.28	0.33	0.14	0.23
6	55.3	68.7	0.26	0.52	0.14	0.38
7	53.0	70.3	0.29	0.35	0.15	0.27
8	56.0	67.6	0.24	0.50	0.13	0.34
9	51.4	67.4	0.26	0.45	0.13	0.30
10	53.5	70.4	0.28	0.41	0.15	0.29
11	53.3	67.8	0.23	0.42	0.12	0.28
12	49.3	63.3	0.23	0.32	0.11	0.20
13	62.6	66.0	0.25	0.52	0.16	0.34
14	54.7	64.0	0.25	0.40	0.14	0.26
15	52.0	63.9	0.40	0.47	0.21	0.30
Average	53.1	66.2	0.27	0.44	0.14	0.29
Average normal non-pregnant women	65.7		0.31		0.20	

At the time of delivery, the maternal plasma volume per unit of whole blood is considerably higher (average—13.1 per cent) than that of the fetus, so that the whole blood fibrin values show a greater difference in favor of the former than do the previously given plasma values. The average maternal whole blood fibrin is 0.29 per cent while the fetal blood contains roughly only one-half as much fibrin.

In order to offset the differences in concentration of the two bloods, the percentage relationships of the albumin, globulin, and fibrin to the total proteins have been calculated and are given in Table VII.

TABLE VII

ALBUMIN, GLOBULIN, AND FIBRIN PERCENTAGES IN FETAL AND MATERNAL PLASMAS

CASE NO.	TOTAL PLASMA PROTEIN GM. PER 100 C.C.		ALBUMIN PER CENT		GLOBULIN PER CENT		FIBRIN PER CENT	
	Fetal	Maternal	Fetal	Maternal	Fetal	Maternal	Fetal	Maternal
1	6.37	7.43	65.9	56.1	29.2	35.3	4.9	8.6
2	5.60	6.70	59.3	61.2	35.5	33.4	4.6	5.4
3	5.67	7.22	52.4	51.8	43.9	42.9	3.7	5.3
4	6.42	7.27	55.8	55.2	38.8	38.1	5.4	6.7
5	6.97	7.02	58.7	56.5	37.3	38.7	4.0	4.7
6	6.26	7.13	59.3	55.3	36.6	37.4	4.1	7.3
7	6.11	6.60	60.7	60.0	34.5	34.7	4.8	5.3
8	5.40	7.01	61.5	50.8	34.1	42.1	4.4	7.1
9	6.75	7.30	60.7	58.6	35.4	35.2	3.8	6.2
10	5.56	7.52	61.9	52.7	33.1	41.9	5.0	5.4
11	6.03	6.45	58.2	57.5	38.0	36.0	3.8	6.5
12	6.12	6.91	62.1	59.3	34.1	36.0	3.8	4.6
13	6.34	7.66	59.5	53.4	36.6	39.8	3.9	6.8
14	6.61	7.98	60.1	56.5	36.2	38.5	3.8	5.0
15	6.66	7.62	59.6	59.4	34.4	34.4	6.0	6.1
Average	6.18	7.18	59.7	56.3	35.9	37.6	4.4	6.1
Average—normal nonpregnant women			7.42	59.6		36.2		4.2

There are no really significant differences in the percentage composition of the two bloods except that the maternal fibrin is much higher relatively as well as absolutely. The fetal albumin averages 3.4 per cent higher than the maternal, while the maternal globulin is 1.7 per cent higher than the fetal. In general, although not invariably, these differences are reflected in the individual samples.

DISCUSSION

From the analytical results presented above, it is evident that there is very little difference in the percentage composition of the total plasma proteins of mother and child as compared with each other or with normal nonpregnant women, except that in the parturient woman the fibrin is increased. It would seem that human beings under normal conditions maintain relative proportions between the various proteins which may be characteristic of the species. Howe²⁴ has collected considerable evidence to show that in different animals the proportions vary to a certain extent.

The fact that the usual percentage relationship is maintained even though the total plasma proteins are diminished during gestation and are still lower in the newborn would seem to indicate that the various proteins are formed individually, rather than from one another, as has been argued, and that some definite set of conditions is directly responsible for the fact that the fetal plasma is relatively protein-poor. We have no definite idea as to what these conditions are, but the variation in the proteins may perhaps be looked upon as a mech-

anism to equalize the osmotic pressures in the two bloods. Calcium, inorganic phosphorus, and the amino-acids have been shown to be constantly in higher concentrations in the fetal plasma, whereas the lipoid phosphorus and the plasma proteins are, except for certain pigments, the only substances which are known to be constantly higher on the maternal side of the placental barrier. The first three substances undoubtedly have some influence upon osmotic pressure even though they are in low concentrations, whereas lipoid phosphorus certainly has a negligible effect and the whole burden of equalization may rest upon the protein substances, which themselves are so slightly ionized at the hydrogen-ion concentration of the blood that a considerable excess must be present in the maternal plasma to neutralize the effects of the calcium, inorganic phosphorus, and amino-acids. It has been shown repeatedly that the depression of the freezing point is the same in the two plasmas,^{25, 26, 27, 28} a fact which indicates that the maintenance of an equal osmotic pressure is normal, and probably essential to proper placental transmission.

The lower absolute and relative fibrin values in fetal blood correspond with its slower clotting time,²⁹ and perhaps also with its greatly prolonged sedimentation time,^{20, 22, 30} if the association of increased fibrin and rapid sedimentation of the blood cells is looked upon as anything more than a coincidence. That fetal blood does clot more slowly is a common observation, as is also the high suspension-stability of the fetal cells. The latter phenomenon is, as far as we know, invariably associated with an increased fibrin and, according to Fähraeus,²² with a definite agglutination of the cells, two things which may well be related. In this connection, it should also be noted that the fetal globulin is lower than the maternal, a fact which Linzenmeier³⁰ thinks is of importance in determining the sedimentation rate of the blood cells. Cholesterol is likewise lower in fetal plasma,^{31, 32, 33, 34, 35} and this diminution may operate with the decreased globulin to promote the increased suspension-stability. (Löhr.²⁰)

Englemann and Elpers³⁶ have shown that the viscosity of fetal blood is markedly greater than that of the maternal blood—5.8 to 3.7. The larger number of blood cells in the fetus³⁷ and their higher volume percentage (Table VI) probably account for this difference, since the diminution of plasma proteins, especially the fibrin and the globulin, should operate in the other direction. Alder⁴ has compared the viscosity of fetal and maternal serum and has shown that the former is less viscous than the latter.

The lowered surface tension found by Alder⁴ in fetal blood is undoubtedly related directly to the diminished quantity of protein in the fetal plasma.

CONCLUSIONS

Fetal plasma is relatively protein-poor as compared with maternal plasma, all the protein fractions being maintained in higher concentrations in the latter.

In spite of these absolute differences, the relative proportions of serum-albumin and serum-globulin are maintained very nearly as in normal nonpregnant women. The fibrin, on the other hand, is both absolutely and relatively increased in the maternal plasma.

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THE PREVENTIVE ASPECTS OF POSTPARTAL CARE*

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ADVANCES in prenatal care have resulted within the last decade in so marked a decrease in mortality that even the most prophetic among us hesitates to say how far reaching will be the social and economic consequences of this salvage of human life. In properly conducted clinics the mortality among parturient women has also been markedly decreased, although to our shame it must be admitted that this is by no means the case outside of such clinics, and as a result the United States is still far down on the list of civilized nations in this regard. For some reason, however, scientific watchfulness seems to end with the delivery of the child, and I think most of us will agree that a large proportion of our gynecologic cases is still, as it always has been, drawn from those women who are the casualties, so to speak, of our own or someone else's obstetric practice.

Recent statistics of the British Government show that 1 in every 400 women confined at full term loses her life, and although the exact figures are not now available and probably never will be, it is not too much to say that for every woman who dies, 5 undergo a period of morbidity, sometimes temporary, but too often resulting in permanent disability and complete invalidism. The major obstetric tragedies are usually sufficiently striking to command our attention, but this is not true of the relatively minor mishaps, and for this reason I think it will not be unprofitable to consider tonight the care of the parturient woman, at least in certain aspects, from the standpoint of preventive medicine.

To a group of specialists it is hardly necessary to emphasize the fact that a systematic examination from six weeks to two months after delivery is quite as important as a systematic examination prior to delivery to determine the proportions of the pelvis and the relative size of the child, but unfortunately this gospel is not universally accepted by the men who are still handling the bulk of obstetric practice. Such an examination, even after a nonoperative, relatively simple labor, will frequently reveal a rather astonishing degree of cervical pathology. Tears of various types may be present, stellate or bilateral, superficial or extensive, and they may even extend into the parametrium or the broad ligament. It is not unusual to find a red, angry, succulent-looking cervix, which bleeds on the slightest manipulation and which is unquestionably pathologic.

In the light of our present knowledge of cervical disease we have no right to dismiss such findings as unimportant. I need not point out to

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you that such a condition may be the foundation not only of a chronic endocervicitis, with its various steps of cyst formation, fibrosis, and hypertrophy and its train of annoying symptoms, but also of an ascending lymphangitis which may terminate in a persistent parametritis or in adnexal pathology. You are aware, too, of the various systemic manifestations of disease which may arise from such a cervical condition.

The choice of treatment must of course be dictated by the circumstances of the individual case. Topical applications may be sufficient for the simple cases, but as a rule even they are better handled by the use of the small electrocautery, a perfectly feasible office procedure which gives eminently satisfactory results. In deep-seated infections cauterization under anesthesia may be necessary, and extensive tears obviously demand repair. I am aware that in some clinics it is still the custom to advise against trachelorrhaphy in women in the childbearing period because of the chance of repeated injury in subsequent pregnancies, but in my opinion this danger is more than overbalanced by the harmful possibilities inherent in a neglected, pathologic cervix.

When the postpartum examination reveals a prolapsed, retroflexed, flabby uterus, where involution has obviously been faulty, the pessary is frequently an effective remedy. Although this agent is today little used in gynecologic practice, its use is widespread among experienced obstetricians in this particular condition. The supporting ligaments of the uterus are soft and flabby during pregnancy, and the uterus itself, even after delivery, is considerably heavier than normal, so that the mechanism of displacements is easy to comprehend. With a properly adjusted Smith or Hodge pessary, however, the uterus may be held in position for two or three months, until it is of normal size and the ligaments have regained their normal tone, and by the timely use of this simple measure subsequent suspensory operations will be cut down at least 30 per cent. On the other hand such a condition, if neglected, may end in decidedly more serious pathology, particularly if it is associated with a relaxed or torn pelvic floor.

In some instances injury to the perineum following delivery is of such a superficial character that repair is not indicated; as a general rule, however, perineorrhaphy immediately after delivery is a wise plan. When this has not been done, repair may possibly not be indicated immediately providing the tear is not extensive, the uterus is well involuted and in good position, and the patient is fairly free from symptoms. Otherwise immediate repair should be advised. Postponement of the necessary surgery under these conditions can only result in a further relaxation of the pelvic floor, the development of cystocele and rectocele with their train of annoying pelvic and vesical symptoms, or even prolapse, for the correction of which decidedly more radical procedures are necessary.

Many of these conditions which we have been discussing are due to lax supervision of the patient's actual period of lying-in. In former

years it was the invariable rule that puerperal women should remain in bed two to four weeks, usually entirely recumbent; in recent years the pendulum has swung to the other extreme, and in some clinics today the patients are encouraged to leave their beds as soon as they feel inclined, no matter how short the time after delivery may be. If we must choose between the extremes, the longer lying-in period is the wiser plan, since one who understands the physiology of the puerperal state and realizes the size and lack of tone of the uterus, the laxity of the supporting ligaments, and the mechanics of intraabdominal pressure, will appreciate the dangers inherent in too early an assumption of the upright position.

Free movement, of course, is highly desirable from the beginning to facilitate drainage, and it is a wise plan to encourage patients within a few hours of delivery to move from side to side, and within a few days to sit up properly supported, but no patient should be allowed out of bed, no matter what day postpartum it may be, until the lochial discharge is practically serous in character and the uterus has retracted well below the symphysis. Even then free movement should be restricted and should be undertaken only gradually.

Another point to be considered in this regard is that enteroptosis, with its train of apparently intractable symptoms, is often acquired in the postpartal period, a consideration particularly worthy of comment in these days when the short abdominal corset or none at all is the rule. Proper support of the overstretched, thinned-out abdominal muscles is essential, and the wearing of an abdominal binder or a properly fitted corset should be rigorously enforced. Passive exercise should be advised during the actual stay in bed, and graded exercises, the knee-chest position, and the continuation of massage should be advised for several weeks postpartum.

Because of the trauma of labor, the lowered intraabdominal pressure consequent upon the tremendous reduction in size of the gravid uterus, and the generally bruised and sensitive condition of the pelvic structures, as well as actual lesions of the vesical mucosa, bladder complications are not infrequent during the puerperium. Overdistention, in fact, is so common after labor that too much stress cannot be laid upon the necessity for frequent and complete evacuations of the bladder. The patient should be encouraged to void within six hours after delivery, and regularly every six or eight hours thereafter. If this is difficult, simple assisting measures should be resorted to, such as warm irrigations, hot applications, possibly warm enemas, even the assumption of the sitting posture if the delivery has been nonoperative and the lacerations are of a minor character. If these measures fail, regular use of the catheter must be resorted to, so that the bladder may be emptied frequently and completely. The strictest asepsis, of course, is essential, and regular urinalyses should be made, so that a possible cystitis may

be recognized and treated at its inception, when the cure is a fairly simple matter. It is hard to say how many of the cases of obstinate trigonitis and cystitis which fall into our hands are due to disregard of this commonsense precaution, and it may be added that while upward extension of the infection is not usual, it is a real possibility, the occurrence of which should be prevented at any cost.

It should be emphasized also that regular urinalyses are important in the postpartal period in those patients who have shown a pyelitis during the prenatal period. The symptoms of this condition are usually readily amenable to the proper treatment and ordinarily disappear when the weight of the gravid uterus is removed, but the continuation of the infection is by no means uncommon, and urologists tell us that it is surprising how often in such cases *B. coli* will be demonstrated in one or both ureters, while an active bladder infection may persist for months afterwards. The proper diagnostic measures will reveal the condition so readily that in view of the grave permanent damage which may result there is little excuse for their neglect when the slightest indications for their employment are present.

Continued observation of the urine is obviously essential in women who have, during their pregnancy, given evidence of any sort of toxemia. Even with the aid of blood chemistry it is frequently not possible to differentiate between a pure nephritic and a preeclamptic toxemia. As a general rule it may be stated that the earlier in the pregnancy the symptoms of renal insufficiency appear, the more likely is the condition to be one of actual nephritis, but since the treatment of both conditions is substantially the same, the differential diagnosis at this stage is not a matter of great moment.

In the postpartal period, however, the situation is different. Eclampsia and preeclamptic toxemia rarely reappear in subsequent pregnancies, and women who have passed through one attack may usually conceive with impunity at a later date, since permanent renal damage is most unusual. On the other hand, a nephritic toxemia tends to reappear in an aggravated form and at an earlier period in each subsequent pregnancy, so that eventually childbearing may jeopardize life. In the puerperal stage the differential diagnosis is usually simple; as a working rule we may say that when casts, albumin, and other urinary abnormalities persist beyond a month or six weeks, the condition is a purely nephritic one, and the patient should be warned that further childbearing is both unwise and actually hazardous.

Most of the suggestions which I have made, you will note, involve merely the application of certain commonsense rules with whose theoretical application we already are in hearty accord, but whose practical employment we are sometimes inclined to overlook because they are so simple and obvious. I believe, however, that if in our daily practice we emphasized the importance of their routine employment, we would

not only lessen considerably the volume of gynecologic surgery which has its raison d'être in careless obstetrics, but would also eliminate to a large degree the period of invalidism which the average woman is too prone to consider an inevitable part of every confinement.

512 HIBERNIA BUILDING.

(*For discussion see page 907.*)

CURETTAGE OF THE UTERUS, ITS INDICATIONS AND ADVANTAGES*

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WITH the exception of case reports, most of them from foreign clinics, barely a dozen titles are listed under the general heading of curettage of the uterus during the last five years. The majority of these condemn the procedure very cordially, and many of them quote with approbation Emmet's dictum, enunciated shortly after Sims had modified and popularized the curette, to the effect that "the ingenuity of man had never devised an instrument capable of doing more injury." It is with considerable trepidation, therefore, that I venture to defend the operation of curettage, in the face of the eminent authorities who have united to condemn it. I am far from wishing to advocate the promiscuous use of this procedure, or to offer it as a panacea for all the gynecologic and most of the obstetric ills to which woman is heir, but I do believe that the tendency today is to belittle its usefulness and to narrow its limitations, while in its stead are performed quite complacently surgical procedures whose technic is more difficult and whose effects are more radical.

The day of curettage for any indication or none at all is happily past, and yet it is too often performed, even now, by men to whom it seems too simple to be dangerous, or who, as Bovée puts it, regard it as the first rung on the ladder which leads to being known as surgeons. It should be axiomatic that any surgical procedure, no matter how simple and trivial it may seem, carries with it the potentialities of a perfectly definite morbidity and mortality, and this is quite as true of curettage as it is of a laparotomy. Certain conditions are prerequisite, therefore, to its successful performance, the first of which is that the man who undertakes it, preferably a gynecologist, should have a comprehensive knowledge of the anatomy of the pelvis and of the pathology which he proposes to remedy. Also it should never be done until a full, carefully taken history has been interpreted in the light of a thorough bimanual examination, again by a man with the requisite knowledge of pelvic anatomy and pathology and with the requisite

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tactile sense to make out the conditions which are present. You cannot curette with a clear conscience until these things have been done.

It is essentially a hospital procedure, in spite of Dr. Kelly's advice to the specialist to do it in his office, and anesthesia, in most instances, is essential to its thorough performance, nitrous oxide or ethylene being the most satisfactory. Occasionally local anesthesia may be indicated in patients in whom organic lesions make full narcosis unwise, and occasionally also, in elderly women with open cervices, a diagnostic curettage may be done without anesthesia, but as a rule the discomfort and actual pain are sufficiently great to make complete relaxation of the pelvic structures impossible without general anesthesia. Last of all, the strictest asepsis is necessary throughout, not only in the instruments and linen used, but also in the preparation of the patient, else the risk of infection being carried upward is considerable.

Our indications for curettage are rather wider than those ordinarily advanced. Polak, for instance, will admit only two, the removal of the products of conception before the eighth week, and the diagnosis of intermenstrual bleeding at or after the menopause. To my mind, however, if we limit ourselves to such narrow indications as these we shall lose many opportunities of relieving our patients by a relatively simple procedure, and we shall certainly, as I propose to show you later, perform a good deal of unnecessarily radical surgery.

The diagnostic indications for curettage are fairly well standardized, the first of them being intermenstrual bleeding or uterine discharge at any age, but particularly at or near the menopause. Uterine hemorrhage in young women may offer some justification for delay, but in view of the disastrous possibilities always inherent in this symptom, I can see no reason for delay in women of menopausal years. This is particularly true of fundal carcinoma, in which early hysterectomy gives probably a higher percentage of cures than we are able to achieve in any other form of pelvic malignancy. For this reason we do routine curettage as a preliminary to all plastic work, whether there are suspicious symptoms present or not. It takes but a few additional minutes and it adds practically nothing to the risk of the operation or the discomfort of convalescence, yet I can recall offhand more than one instance in which by this means unsuspected fundal malignancy was revealed and a life-saving hysterectomy done. Curettage is also done as a routine before irradiation, not only to eliminate possible malignancy but also to remove cervical and uterine polypi, for radium, as you know, should never be applied in the presence of such growths. This does not apply, of course, to irradiation done for cervical malignancy.

Turning to the therapeutic indications for curettage, we are at once upon debatable ground. Naturally there can be no question, in

the face of the work of Cullen and Curtis, that endometritis, *per se*, is a rare clinical entity, and that essential infection of the uterine mucosa is also extremely rare. The fact remains, however, that under certain conditions its removal, although both illogical and empirical, does seem to work either improvement or cure. In dysmenorrhea, for instance, curettage is usually advocated for the membranous type and condemned for all other types. In the few instances of true membranous dysmenorrhea which I have seen, curettage, no matter how often repeated, has done only slight, temporary good, while simple dysmenorrhea, particularly when associated with the so-called polypoid endometritis, has usually been either temporarily or permanently relieved by this measure. I would point out, however, that, particularly in young girls, it should be a last resort and done only when systemic and organic conditions have been eliminated and general dietetic and hygienic measures have been given a thorough trial.

Curettage for sterility is equally irrational and illogical, but here too its empirical performance, particularly if associated with the use of a stem, will result in conception in a small percentage of cases, possibly 15 or 20 per cent, and this is quite as true of the so-called relative or one-child sterility, provided it is not of infectious origin, as of the absolute type. It seems hardly necessary here to reiterate that such a procedure should never be contemplated until the husband has been eliminated as a factor in the trouble. It may be that the dilatation of the cervix rather than the curettage is responsible for the occasional good result, though most authorities, I believe, incline to the opinion that a cervical canal which permits the exit of the menstrual flow will present no insuperable barrier to the ingress of the spermatozoa.

Menorrhagia is not, as a rule, an indication for curettage, since it is usually the symptom of some other condition, adnexal disease, fibroid growths, glandular derangements, even systemic diseases, which are obviously not amenable to local treatment, but here again in rare instances curettage, sometimes repeated as indicated, will afford temporary relief. I have in mind one special case in which curettage at intervals throughout her menstrual life held in check an intractable menorrhagia, often associated with metrorrhagia, and probably of ovarian origin, in a patient who otherwise would have had to submit to a premature menopause from irradiation or hysterectomy many years before. When it no longer checked the bleeding, she was sufficiently near the menopause to warrant the use of both radium and x-ray without annoying menopausal symptoms. Hemorrhage due to persistent subinvolution, which uterine tonics, local treatment and douches, as well as the correction of retrodisplacements, have failed to relieve, is usually ended at once by curettage. In practically every

instance this condition is due to the persistent retention of decidual remnants, and their mechanical removal ends the bleeding.

Hemorrhage due to incomplete abortion, where an open cervix indicates that decidual products and secundines are retained, may demand curettage if the simpler measures of packs, ergot and pituitrin have failed. After the eighth week, however, the débris is better removed with the finger or the sponge forceps. In the presence of infection, whether postabortal or postpartal, curettage should never be done. As DeLee says, it is like raking over a ground freshly sown with seed. In many such infections the process is already systemic, so that local treatment is of no avail, and if it is local, the necrotic process is purely a surface one, and even the gentlest manipulation may break down the protective zone of leucocytic infiltration just beneath it and thus convert a simple local process into a true blood stream septicemia.

Leucorrhea, so often advocated as an indication for curettage, should never be so considered. Its source is extrauterine, usually the cervix or the tubes, and obviously the curette cannot reach them, while its use may possibly convert an extrauterine infection into an intrauterine or even a systemic process. One exception to this rule is in the case of uterine hyperplasias associated with chronically infected cervicies, particularly where cystic degeneration of the glands has begun; in these instances the two conditions should be corrected simultaneously. As a general rule, however, we may say that any sort of infection of the genital tract, latent, chronic or acute, contraindicates curettage, particularly if fever is also present. There may conceivably be conditions in which curettage is indicated, even under these circumstances, but the surgeon who advocates it should do so with a full realization of the added risk he is assuming.

As I have already emphasized, this is not a procedure for the general practitioner; even in the hands of a specialist it is not devoid of danger. There is always, for instance, the possibility of the flare-up of an unsuspected infection, of cervical, tubal or intestinal origin, which even the most scrupulously careful history and examination will not reveal. I recall particularly one instance in which curettage was done for a mild grade of membranous dysmenorrhea, associated with menorrhagia. History and examination revealed not the slightest trace of infection, yet two days later chills and high temperature developed with marked pelvic pain; at the end of ten days a localized pelvic abscess was opened under anesthesia, and a tedious convalescence of many weeks followed. In a second instance curettage was done for an annoying, definitely uterine discharge, the result of an old pelvic inflammation for which salpingectomy had been done many years before. The patient developed both peritonitis and septicemia, together with a retroperitoneal abscess and necrosis of the psoas muscles, and death ensued shortly. I cite these two instances to

point out that even when done for studied indications, by a specialist, the operation sometimes culminates in disaster.

The dangers of the actual operation are almost too well known to need rehearsal. They include rupture of the cervix, from too rapid and too forceful dilatation, particularly with the glove-stretcher type of instrument, whose degree of force is extremely difficult to gauge; puncture of the uterus by the sound, in endeavoring to ascertain its depth and direction, an accident peculiarly likely to occur after abortion, when the uterine wall is thick and vascular, and injury to the intestines, when puncture has occurred, by trauma from the sound, sponge, forceps or curette. In addition there is sometimes the danger of interrupting an unsuspected pregnancy, when no period has been missed or when the patient has willfully given a misleading history.

The advantages of the operation, however, to my mind definitely outweigh its disadvantages and dangers, most of which can be eliminated or at least guarded against if sufficient care is exercised. The procedure, if done by a specialist in pelvic work, is usually a simple and safe one. The period of hospitalization is short, seldom more than three days, so that the inconvenience and expense to the patient is almost minimal. As I have pointed out, curettage is a valuable diagnostic aid, and its routine performance before plastic operations and irradiation not infrequently reveals unsuspected malignant disease and permits the institution of early treatment.

It is frequently curative in dysmenorrhea and occasionally curative in sterility, and in dysmenorrhea, even if it does not cure, it is usually of temporary benefit. In this connection I might quote Dr. Howard Kelly, who, with his usual ripe wisdom, points out that even if the cure is irrational and illogical we should not quarrel with it, since what out patients are after are cures, with or without sound theories behind them. Moreover, temporary relief in dysmenorrhea is usually very gratefully received by the sufferer. More than one patient has told me that the months of relief which were thus afforded her have enabled her to get her physical and nervous balance, so that when the dysmenorrhea recurred—and the recurrence is usually of a less severe type—its effects were by no means so trying. I have not attempted a statistical study in this matter, but I might say that every point I have made could be substantiated by large series of cases.

Possibly most important of all, curettage frequently avoids for the patient a radical and lethal operation. A recent investigation of 222 hysterectomies at Touro Infirmary by Dr. C. Jeff Miller over a three-year period proved this point very conclusively. Nine uteri were reported by the laboratory as entirely negative, and 19 others showed only metritis, fibrosis, or hyperplasia; in addition, there were 3 unsuspected pregnancies and 2 incomplete abortions. On the face of the records, therefore, the simpler measure of curettage would have elim-

inated 33 major operations in this particular series. An even more striking instance recently came to my knowledge, wherein hysterectomy was done for supposed fundal carcinoma in an elderly woman, who succumbed to shock shortly after the conclusion of the operation. The laboratory reported the uterus entirely negative for neoplasm. A preliminary curettage would probably have saved that life.

I have, as I have said, no intention of advocating curettage upon promiscuous indications, or of singing its praises as a gynecologic cure-all. I do believe, however, that it deserves more consideration than is at present accorded it, for the reason that it is a valuable diagnostic aid, that in selected conditions it is palliative and even curative, that it involves as little morbidity, inconvenience and expense as any possible hospital procedure, and that its routine performance as a preliminary to major surgery of the pelvis will render much of that surgery entirely unnecessary.

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THE VALUE OF GLUCOSE AND INSULIN TO THE OBSTETRICIAN AND GYNECOLOGIST*

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WHEN in 1921 the years of earnest endeavor to isolate the anti-diabetic hormone of the pancreas culminated in the successful animal experiments of Banting and Best, and a few months later in its brilliant clinical results in human diabetes, it was not realized that there had been discovered an agent which would exert not only a palliative effect in that particular affection, but also an apparently curative effect in other widely different conditions. Within the last two years, however, due largely to the work of Thalhimer, the addition of insulin to the already successful glucose treatment in certain toxic manifestations of pregnancy has resulted in markedly better results than have ever been achieved by any other type of therapy.

The underlying factor in the pathology recognized as diabetes is an abnormality of the carbohydrate metabolism, and the palliative effect of insulin in this condition lies in its power to promote the combustion of carbohydrates. This being the case, it was almost natural that the use of insulin should have been gradually extended to other conditions in which, although the pathology was not clearly understood, it was realized that the carbohydrate factor was at fault. Glucose, as we have said, had already given good results in certain of the toxemias of pregnancy, and the logical reasoning was that, since its administration alone gave good results, certainly the additional administration of insulin, with the consequent increased rapidity of the utilization of the glucose, would bring to pass these desired results even more rapidly.

Thalhimer's work on postoperative acidosis accompanied by vomiting led him to subsequent studies upon the so-called pernicious or toxic vomiting of pregnancy, the basic idea being that the acidosis which is so prominent a factor in the last stages of this type of vomiting is not only a result of the stomach's intolerance of food, but also a factor in producing that intolerance. It follows, then, that if the resulting vicious circle can be broken through, either by abortion, which checks the vomiting from the standpoint of the toxin of pregnancy which has produced it, or by the correction of the acidosis, which the administration of glucose and insulin does admirably, the pathology will either be considerably curtailed or actually eliminated.

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It might be added that if the vomiting is not checked, a starvation acidosis will result whether the original vomiting was of the toxic or the neurotic type.

To date we have used glucose and insulin in six cases of vomiting of pregnancy, all them definitely of the toxic type, as proved by the low blood sugar and the low CO₂-combining power of the blood, as well as by acetone in the urine of four cases. In no instance was abortion necessary; four of the patients have subsequently been delivered at term, and in the other two cases the pregnancy was progressing normally when the patients were last seen. In two instances the recovery was dramatic in its rapidity, and one of these cases is herewith appended:

Mrs. G. was admitted to the hospital when four months' pregnant. She had been vomiting for six weeks and was completely dehydrated; she was retaining nothing and was vomiting blood. Pulse 118, temperature 101° F. Urinalysis showed both acetone and diacetic acid, and the blood sugar and the CO₂-combining power of the blood were far below normal limits. Treatment before admission had included the usual measures of peptonized food, hypodermoclysis, proctoclysis, gastric lavage, etc., without the slightest alleviation of the condition, and their repetition within the hospital was also without result. After glucose and insulin had been administered twice the vomiting ceased abruptly, food was given without restriction, and the remainder of the pregnancy was without incident. This is the type of case which under the old methods of treatment would inevitably have demanded therapeutic abortion, perhaps with a fatal outcome, as the patient's condition was most critical when she was first seen. I might add as an irrelevant but rather interesting fact that when the child was eighteen months old he developed a severe acidosis, which was treated by Dr. L. R. DeBuys of the Pediatric Service by glucose and insulin, with immediate good results.

We have used this form of therapy with excellent results in eclampsia and preeclamptic toxemia. The etiology of these conditions is as yet entirely obscure, but as a result of personal research work, recently published in *Surgery, Gynecology and Obstetrics*, I believe I have clearly demonstrated that either an acidosis or a tendency to acidosis exists in both of these conditions. To review the work briefly, in a study of fifty such cases I have uniformly found that the blood sugar is materially reduced, as is the CO₂-combining power of the blood, and that there is practically no change in its nitrogenous constituents, while in advanced cases both acetone and diacetic acid are demonstrated in the urine. In our clinic it is a routine practice to differentiate these cases from the purely renal conditions by detailed investigations into the diastatic activity of the urine, the relative amounts of serum albumin and serum globulin, casts, blood chemistry, and kidney function by the phenolsulphonephthalein test. In none of the purely nephritic cases did we find either the blood sugar or the CO₂-combining power of the blood lowered.

Mann in his experimental work on dogs proved quite definitely that following hepatectomy a definite decrease in blood-sugar results, with

a consequent decrease of the glycogen content of the muscles, and subsequent convulsions and coma. The parallel with eclampsia is quite clear. Large series of autopsies have shown that in that affection there is a destruction of the liver which for all practical purposes is the equivalent of its entire or its partial surgical removal; Krebs and Dieckmann have shown that there is a definite impairment of the liver function as a result of this destruction, their work being based on the Rosenthal test; and the classical symptoms of eclampsia, convulsions and coma, are only too well known to those of us who are practicing obstetricians. In any destruction of the liver, therefore, whether by surgical removal or as the result of disease, the carbohydrate metabolism and the storage of glycogen are seriously impaired, the blood sugar and CO₂-combining power of the blood are lowered, and either acidosis or a tendency to acidosis results, with the actual occurrence of acetone and diacetic acid in the urine, due to the imperfect combustion of fats in the absence of the necessary glucose.

In some fifteen cases we have demonstrated to our own satisfaction that the addition of insulin to glucose in the treatment of eclampsia and preeclamptic toxemia is a tremendous advance over any previous treatment. In our clinic conservative treatment is the routine in eclampsia. We employ either the Stroganoff or the Dublin Rotunda method, combined with venesection in the face of a rising or persistently high blood pressure, and the administration of glucose and insulin. In every case in which we have employed this treatment the blood sugar and the CO₂-combining power of the blood have risen; the diastatic activity of the urine, which is always high, has approached normal figures; convulsions have ceased, and the patient's general condition has been markedly improved.

In the employment of glucose and insulin it is most important to differentiate between a true preeclamptic or eclamptic toxemia and a purely renal condition. If we are dealing with a kidney condition alone, glucose and insulin are valueless, since their effect is directed entirely towards staying the destructive processes of the liver and restoring the carbohydrate balance. Eclampsia, however, may give rise to a recent secondary nephritis, with partial or entire suppression of urine, and in two such instances in this series I employed a 20 per cent glucose solution (twice the percentage ordinarily used), in the hope that the usual amount of insulin would utilize sufficient of the glucose to restore the carbohydrate balance, while the remainder of the glucose would act upon the kidneys as a diuretic. In both instances the patients recovered, but whether their recovery was a consequence of this theoretic treatment I am unable to say. It might also be added that if the facts which I have stated are correct, our present habit of restricting the diet of patients in true eclamptic toxemia is radically wrong, and the only restriction should be in the use of fats.

We have also used glucose and insulin with marked success in the acidosis which follows hemorrhage. Our first case of this type, which occurred over a year ago, was reported by the author and Dr. Henry Machecca in the *New Orleans Medical and Surgical Journal*, and is briefly appended hereto. Since then I have personally handled two more such cases, and have seen a fourth successfully handled by another man on our division.

The theory is briefly this: the clinical evidences of shock include complete muscular relaxation or feeble and irregular movements; pallor; dilated pupils; semiconsciousness or diminished sensibility and mental activity; feeble respirations; small, frequent, and dicrotic pulse; subnormal temperature; vomiting; low blood pressure, and acetone in the urine. Practically all of these criteria, I might say, were present in each of the cases under discussion. The work of Cannon has proved that although acidosis is not necessarily present in conditions clinically diagnosed as shock, in the majority of instances it does exist and it may be extreme. Moreover, in no condition is rapidity of treatment more essential, which furnishes, to my mind, a cogent reason for including insulin in the already established glucose therapy. Whether the excellent results are due to the entire consumption of glucose administered (as is shown by the absence of sugar and acetone in the urine shortly afterwards), or to the fact that the body is enabled to hold fluids which otherwise would have been excreted by the kidneys subsequent to their stimulation by free glucose, we cannot say, but the brilliant recoveries of the patient speak for themselves.

CASE 1 (previously reported by the author and Dr. Henry Machecca).—The patient was admitted after profuse hemorrhage lasting for several days, following a criminal abortion. All the classical signs of shock were present, including a pulse of 140, temperature 97.6° F. and blood pressure 75 systolic. Vaginal packing and pituitrin by hypodermic injection were followed shortly by a transfusion of 250 c.c. of citrated blood. Vomiting began within three hours and continued almost without cessation for twelve hours. Meantime the condition of shock increased in spite of every measure to combat it, the blood pressure fell to 70 systolic, and death seemed imminent. At this time a catheterized specimen of urine showed an acid reaction and quantities of acetone. On this indication intravenous glucose was given at once with insulin, and the same procedure was repeated within two hours. The relief of the vomiting was almost instantaneous, the urine was acetone-free within six hours, and further recovery was uneventful.

CASE 2.—This patient had a manual removal of a retained placenta after persistent hemorrhage. Shock ensued, with a systolic pressure of 80; nausea and vomiting within a period of ten hours, and acetone in the urine. Glucose and insulin gave immediate results.

CASE 3.—This patient was admitted with profuse hemorrhage following a spontaneous incomplete abortion. Her blood pressure was 82 systolic, there was acetone in the urine, and she was nauseated, although she had not begun to vomit. Glucose and insulin were given at once as a prophylactic measure, and the condition cleared up without further symptoms.

CASE 4 (reported by the courtesy of Dr. Arthur Caire, Jr.).—This patient presented the typical symptoms of shock after a postpartal hemorrhage, including nausea, vomiting, and acetone in the urine. The response to glucose and insulin was immediate.

A fourth use for this type of therapy has recently occurred to me, and although I have had no opportunity of trying it out, I am including it here as a matter of record. Dr. John O. Polak, who is an ardent advocate of small, repeated blood transfusions (200 to 300 c.c.) in any sort of gynecologic or obstetric sepsis, recently told me that since he has learned that Rabinowitz, of Montreal, has demonstrated that an acidosis exists in all such cases, he has been giving his patients, in addition to the whole blood, an equal amount of slightly alkalinized Ringer's solution. Theoretically this is correct, but the work of Mann upon hepatectomized dogs, to which I have already referred, has shown that the metallic alkalis have no effect in retarding inevitable rapid death under these conditions. Since glucose and insulin, however, have the desired effect, would it not be logical to employ them in the acidosis of sepsis? Theoretically there could be no objection, and it will be interesting to note the clinical results when an opportunity is offered of trying out the treatment.

The technic of the administration of glucose and insulin is important. In our clinic we use a modification of Thalhimer's technic, giving from 500 to 1,000 c.c. of 10 per cent glucose, according to the indications, gauging the insulin so that 1 unit is given for each 3 grams of glucose, administering one-third of the amount of each until the entire quantity has been given, and giving the solution as slowly as in the Matas intravenous drip. The glucose is always given intravenously, since experience has shown that uniformity of result cannot be achieved by any other mode of administration, and the insulin, of course, is given by hypodermic. The strictest asepsis should be observed, and special care must be taken that the glucose is chemically pure and that none is held in suspension.

In conclusion, it should be emphasized that this is not a form of therapy to be given on haphazard indications. Unfortunately, in dealing with the toxemias of pregnancy we are dealing with conditions whose etiology is unknown, and any form of treatment is necessarily empiric and directed only towards the relief of symptoms, but at least we can be as scientific as possible under the circumstances. In particular, careful laboratory determinations are essential, and accurate estimation of the dosage is based on the results of these findings. In this connection I might say that I consider such pronouncements as the recent one of Stander and Duncan capable of doing incalculable harm. I disagree with them about the blood-sugar content in eclampsia—their findings of an increased blood-sugar content are directly contrary to mine of a consistently lowered one—but, aside from that, their advice to use

insulin without the necessary quota of glucose to my mind sets a most dangerous precedent. Until we are more certain of our course, caution must be the watchword, or a very valuable addition to our obstetric armamentarium will certainly be discredited.

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PHYSICIANS' AND SURGEONS' BUILDING. (For discussion see page 907.)

INTRACRANIAL HEMORRHAGE OF THE NEWBORN*

BY JOHN F. DICKS, M.D., NEW ORLEANS, LA.

TWO distinct causes must be considered in any study of intracranial hemorrhage of the newborn, mechanical and traumatic factors, and hemorrhagic diathesis or hemorrhagic disease of the newborn, upon which certain investigators have laid much stress as a causative factor of intracranial hemorrhage. In a report made by Warwick in 1921, covering two hundred autopsies on newborn infants, 40 per cent of the cases showed evidence of intracranial hemorrhage, two-fifths of which, in her opinion, were caused by hemorrhagic disease. Rodda, who has done a great deal of original investigation upon the coagulation time of infants, states that 25 per cent of all newborn babies with cerebral hemorrhage show evidence of hemorrhage in other organs of the body also. Aside from experimental and laboratory work, there is much clinical evidence to support the theory of hemorrhagic disease. Rosamond, for instance, reports a case of intracranial hemorrhage following cesarean section, and numerous cases are on record of such a condition following normal delivery.

With all due respect to the important studies which have been made along these lines, I believe that too much importance has been attached to the hemorrhagic disease theory, and that we as obstetricians are rather too inclined to use it as a cloak to cover our obstetric errors. Trauma, to my mind, is the most important factor in intracranial hemorrhage of the newborn, although it must be admitted that in a fair percentage of cases this trauma is beyond the control of the obstetrician. It is the sudden or excessive compression of the head which most often

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does the damage, as in a precipitate delivery; the slow pressure on the cranial bones during their passage through the birth canal plays small part.

It is now generally believed that breech deliveries are responsible for more cases of intracranial hemorrhage than any other complication of labor. It was formerly believed that asphyxia caused by pressure on the cord of the after-coming head was responsible for most of these deaths, but large series of autopsies have proved that intracranial hemorrhage is most often the cause. Brown, basing his observations on four hundred autopsies, concludes that intracranial hemorrhage is ten times more likely to occur in premature labor than in labor at term, and statistics in general go to prove that the most deadly combination for cerebral hemorrhage is the premature breech delivery.

The condition is important enough and frequent enough to warrant our careful attention. In large maternities it is now generally admitted that fully one-half of the stillbirths and the deaths during the first week of life are due to the cerebral hemorrhage, and investigations of orthopedists and pediatricians clearly show that a considerable percentage of the paraplegias of late childhood may be traced directly to the hemorrhagic brain at birth. Little in 1861 first emphasized the importance of these lesions in later life, but the direct connection between cerebral hemorrhage and the so-called Little's disease was first demonstrated by Sarah McNutt in 1885 in a series of ten autopsies.

Beneke in 1910 described the pathology and frequency of tentorial lacerations and since that time most authors have agreed with him that intracranial hemorrhages of clinical importance are most often situated above or below the tentorium cerebelli. Eardley Holland's exhaustive report to the Ministry of Health in 1922 bears out this theory and I take the liberty of quoting him freely in the following paragraphs.

His investigation shows that out of 167 fetuses dying during the course of labor the tentorium was found torn in 81 cases (48 per cent), with associated tearing of the falx cerebri in five cases and with subdural hemorrhage in all but six. In most cases the injury followed a breech or a forceps delivery, but in a few instances the labor was apparently entirely normal.

Holland has also explained the mechanism of these tears in a most satisfactory manner. Normally, he claims, the septa are in a state of rest, and nowhere in a state of positive tension. When the head undergoes changes of shape, alterations in the tension of the septa are inevitable, owing to the nature of their attachment to the cranial bones. He illustrates their behavior by the following experiment:

The scalp is reflected from a fetal head, and sufficient of one parietal bone removed to allow the corresponding cerebral hemisphere to be removed and the septa to be viewed. The head is compressed in the occipito-frontal diameter, so that it is shortened anteroposteriorly by the for-

ward displacement of the occipital bone, and heightened by the elevation and bending of the vault. The middle two-thirds and the inferior free edge of the falx cerebri and the tentorium cerebelli will seem to become stretched and tense. If the compression be continued the tension will increase, and finally the tentorium will become overstretched and tear near its free border, just below its junction with the falx.

Apart from the effects of tearing and hemorrhage, we must also consider the general rise of intracranial pressure. Just what part it plays in causing death we do not as yet know, but it is evident that the crowding down of the medulla oblongata into the foramen magnum must result in dangerous pressure on the so-called vital center.

In my experience the order of symptoms in intracranial hemorrhage is almost pathognomonic. For the first twenty-four to thirty-six hours after birth little unusual is noted, except that the child is apathetic and not inclined to nurse, and the cry is feeble. These symptoms may be combined with difficulty of resuscitation, and there may be also an unusual pallor, or intermittent cyanosis. The pulse is usually slower than normal, but strong and full. In about forty-eight hours after birth, however, the temperature suddenly rises to 104° or over, the respiration becomes rapid and superficial, convulsions and opisthotonus follow, and the classic picture is complete.

I append the following case reports as typical illustrative instances of the condition:

CASE 1.—K. W., born June 12, 1924. The history of the labor is important, as the mother was an elderly primipara, and the first stage was unusually tedious. Complete dilatation occurred after fifteen hours of pains at three or four minute intervals, and the head was well engaged, but no apparent progress was made, in spite of a small dose of pituitrin. After several hours of rest induced by morphia the pains were still ineffective, and I finally applied forceps, delivering a 7 pounds, 15 ounces female child without difficulty. The child did not cry spontaneously, but was easily resuscitated. It was noted at birth that the anterior fontanelle was extremely small, and that the child showed a disinclination to nurse, but aside from a slight cyanosis there was no sign of abnormality for the first forty-eight hours. Then the temperature rose sharply to 104°, she refused the breast absolutely, and clonic convulsions shortly ensued at irregular intervals. Drs. Bloom and Delahoussaye of the Pediatric Service were immediately called into consultation and assumed charge of the case. A spinal puncture was done, bloody fluid being obtained under pressure, and 20 c.c. of whole blood was taken from the father and given subcutaneously. The convulsions were controlled almost at once and the child's general condition seemed better. Repetition of the treatment twenty-four hours later resulted in marked improvement, and except for a few slight convulsions on the morning of the third day there were no further symptoms. I might add that at the second spinal puncture the fluid was clearer and under less pressure. The child today is apparently normal in every respect.

CASE 2.—J. W., born February 8, 1926. This case well illustrates the type of delivery in which intracranial hemorrhage so often occurs. The mother was a multipara, aged twenty-six, there was a face presentation, and complete dilatation occurred after fifteen minutes of hard labor. The condition was recognized immediately, anesthesia administered to the surgical degree, a deep episiotomy done at once, and

the face lifted over the perineum. At the time of delivery the face was almost black from pressure due to rapid descent in the extended position, and the child was resuscitated only after considerable difficulty. He was a male, weighing 7 pounds, and there was no external evidence of injury, although even after regular respiration was established the cry was feeble and of a moaning character. Dr. C. J. Bloom was called into the case immediately after delivery, although, aside from vomiting after each feeding, there were no alarming symptoms for the first forty-eight hours. Then the temperature went to 105°, the breast was refused, opisthotonus developed, and the vomiting was continuous. Spinal puncture was done at once, and 30 c.c. of bloody fluid was removed; a second puncture was done in twenty-four hours and 25 c.c. of bloody fluid removed. Hypodermoclysis of 5 per cent glucose was also administered. On the fourth day there was marked cyanosis, continued vomiting, labored respiration, rigidity, moaning cries, and intermittent clonic convulsions. The temperature was almost 107° and death seemed imminent. Hypodermoclysis was repeated at intervals, and twenty-four hours later there was considerable improvement, the temperature being lowered to 103°. From that time on there was a slow but constant improvement, and when the child was discharged, on the fifteenth day, there were no untoward symptoms. At present he weighs 11½ pounds, and except for sluggish pupillary reflexes seems entirely normal, although it is too soon to prophesy what the ultimate outcome will be.

CONCLUSIONS

The following conclusions, based upon the experience of others as well as upon my own, seem warranted:

1. Close cooperation is indicated between the obstetrician and the pediatrician on every maternity service, particularly following abnormal deliveries or in the presence of the slightest untoward symptom exhibited by a newborn infant.
2. If the obstetrician assumes the responsibility for the care of the child, he should examine it routinely every day for the first few days, and institute prophylactic treatment on the slightest indication of trouble.
3. Intracranial hemorrhage is the most frequent cause of cyanosis in the newborn, and should always be suspected whether the cyanosis is constant or fleeting.
4. Lumbar puncture should be employed frequently as a diagnostic aid, and not as a last resort in the presence of unmistakable symptoms.
5. In this day of preventive medicine the newborn infant has a right to expect the closest attention during its first week of life, and only by such attention can immediate and eventual catastrophes be avoided.
6. Trauma is the most constant cause of intracranial hemorrhage, and it should be emphasized that while it is sometimes unavoidable, it is very often the result of poor obstetrics.

THE VOORHEES BAG IN THE INDUCTION OF LABOR, A
CRITICISM

BY ALFRED L. MADDEN, M.D., ALBANY, N. Y.

THE cause of the onset of labor is unknown. As a result, the use of any device for instituting labor rests entirely upon experience. Physiologically the operative methods employed for this purpose depend upon the response of muscle to mechanical stimuli. The more important devices used are: the bag, the bougie, the rectal tube, and the gauze pack. Regarding the last three: The bougie stimulates a narrow zone from fundus to external os, but its action is well defined only as the spontaneous onset of labor is at hand. The rectal tube stimulates cervix and lower uterine segment, but not to equal degree in all points of their circumferences, since it is impossible to apply it accurately. The gauze pack stimulates cervix and, through vaginal vault, the lower uterine segment but, being soft and compressible, the resulting action is too often mild and insufficient. Considered from the viewpoint of degree of activity aroused, the bag best adapts itself to the end desired.

The Voorhees bag is a rubberized cloth bag, of conical shape, flat base, having at its apex a long filling tube. In manufacture it is rendered inelastic. Various sizes, suitable for cervices of greater or lesser patency, are available. The important features of the bag are its rigidity and its shape, which, as viewed from the side, is that of a mechanical wedge. While the bag avoids the limitations of other devices, it has definite shortcomings peculiar to itself.

The primary use of the bag is that of a means of inducing labor, either before, at, or after term. It is also used to efface cervix as a preliminary to manual dilatation, and it is of inestimable value for lessening the hemorrhage of placenta previa, and for the retention, after replacement, of the prolapsed umbilical cord. Its occasional use as a means of dilating the vagina and perineum is incidental.

Simplicity of use renders the bag readily available to all, whether aware of its peculiarities or not. The method of introduction demands merely a knowledge of asepsis. Introduction is accomplished either by touch or by sight, the latter permitting a more secure technic and being the more satisfactory. After sterilization by prolonged immersion in strong bichloride solution or by actual boiling, the bag is rolled into the smallest possible mass, usually along an oblique line from base to side, and then passed directly into the cavity of the uterus; filling with sterile water or a weak antiseptic solution unfurls and distends it, the apex being guided into the cervix by

the filling tube. Degree of distention varies slightly according to the operator's choice; as a general rule it is carried to the uttermost limit, exception occurring in conditions of extreme cervical friability, as met with in placenta previa. The onset of contractions may occur immediately, but more often is postponed for from two to eight hours. At onset contractions are stronger and of greater frequency and duration than at the onset of spontaneous labor, and the degree of subjective pain is correspondingly increased. It must be noted that the position of the bag in the uterus varies both with the size of bag employed and with the degree of cervical dilatation at the time of insertion; it also varies from hour to hour as cervix dilates and the bag is gradually extruded. Descent of the filling tube gives a probable index as to advance of the bag through the cervix.

Intrauterine tension is increased by the introduction of the bag. The presenting part is elevated, disengaged in whole or in part, and removed from intimate relation to the cervix and lower segment. This upward crowding of the fetus may serve as a factor for stimulation of the upper uterine segment and must accompany an increase in the tension of both the uterine and amniotic cavities. A more important alteration occurring on bag introduction is the direct mechanical irritation of the cervix and the lower segment, greatest at the internal os, since the direct support of the bag is had there. Stimulation of the lower segment follows contact with rim and sides of the bag, especially after adaptation to the shape of the bag by the forces of labor.

Statistics covering labors induced by means of the Voorhees' bag require interpretation. In general, they may be summarized by the statement that 30 to 40 per cent terminate spontaneously and 60 to 70 per cent operatively. Variations in percentages directly follow variations in the indications for the induction of labor. As the field is widened to include more cases at or near term, involving a greater number of nearly or fully prepared cervices, the percentage of spontaneous deliveries increases. In the majority of operative terminations the indication for interference is neither one of inertia, nor one of disproportion, but it is the indication of a failure of progressive cervical dilatation, occasionally during, but more often after, removal of the bag. It is an indication of replacement of the normal passivity of the lower uterine segment by tonicity, and it implies the presence of contraction ring dystocia or of retraction of the lower uterine segment.

The ideal result would occur when bag introduction was followed successively by onset of labor, expulsion of bag, and uneventful progress of labor to complete dilatation of cervix and birth of the child. Such a result is the exception rather than the rule. The exception is determined by the characteristics of the individual cervix subjected to

this device. That cervix which is, to all practical purposes, fully prepared for the spontaneous onset of labor, as evidenced by shortening, softening, obliteration of the internal os and dilatation of the external os to one, one and one-half or more fingerbreadths will, upon bag introduction, take up and carry through the stages of labor quickly and uneventfully. On the other hand, that cervix which is unprepared for labor through preservation of length, firm consistency, uneffaced internal os and undilated external os, will react to bag introduction with tumultuous and obstructed labor. The painless contractions of pregnancy have as their primary function the development of the lower uterine segment and the effacement of the internal os. The first requirement for normal labor is the existence of these changes. The introduction of a bag before the existence of these changes cannot be expected to result in an even quasi-normal labor, and for such one must not hope. The term "rigid cervix" cloaked many cases of the type referred to, and prevented correct diagnosis. The reason for failure lies in an excessive irritation of the lower segment at a time when it is insufficiently differentiated from the upper segment to have entirely abandoned the rôle of contractility, and when the period of time required for extrusion of the bag, with removal of the irritating factor, is long by reason of the extent of work required. The resultant is a prolonged stimulation of a large area of contractile tissue by a tense, inelastic foreign body. That summation of stimuli produces tonicity is to be expected, and for the removal of this tonicity either inertia, resulting from prolonged labor, or deep surgical anesthesia is necessary. The normal mechanism of cervical dilatation is blocked at the junction of the upper and the lower uterine segments. Individual contractions thin and draw up the cervix and lower segment by elongation and withdrawal of their constituent fibers. Tone, or spasm, in the lower segment abolishes these processes; labor continues, but dilatation does not advance. The increased intrauterine tension may produce a purely mechanical, downward, pressure enlargement of cervix sufficient to expel the bag, and acting solely through shape and rigidity of the bag; but this succeeding, all else fails. The experiment with narcotics, or with degrees of anesthesia less than sufficient to produce complete muscular relaxation, is useless; that which does not relax skeletal muscle has still less effect upon tonic uterine muscle. The difficulty is not as great with retraction of the lower segment as it is with contraction ring dystocia, but this lesser degree is insufficient to remove the need for deep, continued anesthesia.

One can only admit that structures normally intermittently stimulated by the soft, elastic "bag of waters," can hardly be expected to respond in a like manner to stimulation by a tense, rigid device, constantly applied and producing an increase of intrauterine tension;

one can but foresee overexcitation and consequent overaction. The possibility of spontaneous labor can exist only as a completely differentiated lower segment and an effaced internal os render labor of short duration, giving less time for excitation of the lower segment. In all other cases one can predict manual dilatation and operative delivery, and here the end sought by introduction of the bag should be clearly understood to consist entirely in a softening and enlargement of cervix permitting the ready performance of manual dilatation. Only by such realization can the entire course of labor be formulated, and only thus can the patient be protected from the necessity of demonstrating by hours of unproductive agony the need for operative interference. Manual dilatation of cervix is attended by less extensive laceration when edema is absent. Disappearance of tone occurs with lessened concentration and duration of anesthetic in direct proportion to a shorter period of stimulation. While it is the aim of every physician to afford each individual patient the full opportunity of demonstrating her capabilities, while it is taken for granted that each case demands its right to the test of labor, nevertheless, one must admit that the introduction into the uterus of a foreign body produces an altogether abnormal condition, and that the best interests of the patient are served only by proper interference at the moment when the bag has accomplished its full function, that is at the moment when manual dilatation of the cervix can be readily performed. To prolong expectancy until the cervix is edematous and friable, and until the maximum of lower segment tonicity has appeared, is merely to place trust in powers whose efficiency has been nullified and counterpoised by the primary means employed. It were better by attentive observation to determine the time of manual dilatability than to have this eventually forced upon a reluctant assent. With a wave of enthusiasm existing in favor of version and breech extraction as the elective modes of operative delivery, this becomes all the more necessary. Version and extraction can be quickly and safely accomplished only as the uterus is completely relaxed. Anesthesia in the hands of one inexperienced with the degree of saturation necessary in the presence of lower segment tonicity is rarely productive of peace of mind of operator, dividing his attention, as it does, between the operation and the anesthetic, principally to the latter rather than to the work directly at his hand, and rendering delivery longer, more difficult and more dangerous from the necessarily increased intrauterine manipulation, and more by the descent of the aftercoming head. Extension, delay, forcible extraction, and other complications, to say nothing of forgotten surgical technic, are the aftermath. These may be minimized only as delivery is accomplished before the appearance of lower segment tonicity, or in its early stages before full development. While the average organically nor-

mal patient will withstand prolonged anesthesia to the point of complete pupillary dilatation, the occasional abnormal patient does so only with grave danger. It is, moreover, a tacit admission of ignorance or of lack of attention to permit the full appearance of retraction and the necessity for sublethal anesthesia.

The bag, therefore, in itself, as an agency for the induction of labor, is inadequate: Where it may be successfully employed, it is often unnecessary; expectaney is as certain and more logical. Where necessary, the bag merely precedes manual dilatation, and its use must be recognized as being strictly limited to the production of dilatable cervix.

361 STATE STREET.

ON THE GASTRIC JUICE DURING PREGNANCY*

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THE digestive disturbances during pregnancy as well as the changes in appetite and peculiar desires for certain foods, have all been well known and recorded very early in the history of medicine. Nausea and vomiting early in pregnancy, morning sickness so-called, are classified in most textbooks under the heading of the presumptive signs of pregnancy. However, in spite of these well-known clinical facts, very little work has been done on the analysis of the gastric juice during pregnancy, even to the present time.

Kehrer, in 1905, reports the examination of the stomach contents during pregnancy. His findings suggest that there is a decrease in the amount of gastric hydrochloric acid, which he considers usual for pregnancy. His work precedes the introduction of the Rehfuss tube and the present-day fractional method of analysis.

Before starting this work about a year ago, I found no reference in the literature dealing with fractional analysis of the gastric juice during pregnancy. Since this work was started, Tetsutaroo Nakai reported in the *Tokio Journal of Bio-Chemistry*, October, 1925, some recent work on the gastric juice in pregnancy. This journal came to my attention two weeks ago, and since my findings practically coincide with his, I thought it would be well to present these data immediately, although I had hoped to carry the work further before presenting it.

Nakai studied the gastric juice in six cases of early pregnancy (first five months) and in eight cases during late pregnancy. From this work he concludes that during pregnancy the free acidity and total acidity of the gastric juice are lower than in nonpregnant cases, and that this deficiency is more marked during the first half.

*Read April 6, 1926, before the meeting of the Washington University Medical Society, St. Louis, Mo.

As I have mentioned, my work on the study of the stomach contents during pregnancy was started a year ago. It was suggested to me by Dr. Otto H. Schwarz, who had previously noted a decrease in the hydrochloric acid in three cases of early pregnancy in which the gastric contents had been examined. I have attempted to examine by the fractional method the gastric juice of the pregnant woman early in pregnancy at a time when the digestive symptoms are most marked, and again in late pregnancy after these symptoms have usually disappeared. Only cases in which the tube was inserted with comparative ease are considered. The existing nausea and vomiting make it difficult in some instances for the patient to swallow the tube, and whenever any difficulty was encountered, such cases were not used.

METHOD OF ANALYSIS

The pregnant woman to be examined was instructed to eat nothing after 6 P.M. the day before, and to drink nothing after 6 A.M. the next day, when between nine and ten o'clock she swallowed a Rehfuss stomach tube, through which all of the stomach contents were removed. The tube was allowed to remain in the stomach and was fastened with adhesive tape so that it could neither slide farther down or be pulled out. She then ate a test meal consisting of a shredded wheat biscuit and 300 c.c. of water. Fractions of approximately fifteen c.c. were removed 45, 60 and 75 minutes after the patient actually started eating the meal. Five or ten c.c. of each sample were examined quantitatively by Toepper's method for free hydrochloric acid and using phenolphthalein as an indicator for total acid titrating against tenth normal sodium hydroxide. Interesting results were obtained as shown in Tables I and II.

Nausea and vomiting in early pregnancy, as the term "morning sickness" implies, occurs most commonly in the morning, usually just after the patient gets out of bed. It is a well-known fact that if the patient before arising, eats a few crackers or a piece of toast and then does not get out of bed until forty-five minutes or an hour later, the nausea and vomiting in a great many cases may be prevented. Now, if we consider the results as outlined in the chart, it will be seen that in both early and late pregnancy there is a marked deficiency of hydrochloric acid in the stomach, and that this hypochlorhydria is more pronounced the first three or four months, the time when nausea and vomiting are most commonly found. It will also be noted that the acidity of the gastric contents is greatest approximately one hour after eating, and it is at this time that the patient is instructed to get out of bed and that the vomiting does not occur. This would suggest some relation between the vomiting and the acidity of the gastric contents. We therefore administered hydrochloric acid in a series of twenty cases of early pregnancy complaining of digestive symptoms, with astonishing results.

A patient, E. M., twenty-nine years of age, gravida iv, two months pregnant, had been vomiting each morning after getting out of bed, and three or four times during the day for three weeks, during which time the patient lost twelve pounds in weight. She was given ten drops of dilute hydrochloric acid in a half glass of

water just before getting out of bed in the morning and before each meal. The patient returned to the clinic three days later and had not vomited since she started taking the acid. Two weeks later, the last time the patient was seen in the clinic, she still had not vomited.

Another patient, B. B., age thirty-eight years, gravida iv, approximately two months pregnant, complaining of vomiting each morning and "heart-burn" after eating, was given ten drops of dilute hydrochloric acid before getting out of bed in the morning and before each meal. She returned to the clinic two weeks later, telling us that she vomited in the morning on two occasions since she started taking hydrochloric acid, and that both mornings she forgot to take her medicine. The "heart-burn" had disappeared.

Using dilute hydrochloric acid, 10 to 15 drops in one-half glass of water before getting out of bed in the morning and before meals, we have treated twenty consecutive cases of early nausea and vomiting of pregnancy in our prenatal clinic. These patients have varied in the number of pregnancies from primipara to gravida viii; in ages from seventeen to thirty-eight years, and include both colored and white.

TABLE I
GASTRIC ACIDITY IN EARLY PREGNANCY

PT.	DURATION OF PREGNANCY	FREE HCl				TOTAL ACIDITY			
		FAST	45 MIN.	1 HR.	1 HR. AND 15 MIN.	FAST	45 MIN.	1 HR.	1 HR. AND 15 MIN.
M. T.	2 mo.	4	17	18	11	40	32	35	30
F. S.	2½ "	0	0	2	0	30	15	20	16
L. D.	3 "	0	0	0	0	14	10	15	8.5
R. T.	2 "	0	7	11	5	21	28	28	18.5
B. S.	2½ "	0	0	6	27	8.8	8	17	41
M. C.	1½ "	0	6.7	11.1	6	20	18	30	23
J. D.	2½ "	2	3	14	4	14	14	30	18
M. S.	2¾ "	4	0	0	8	20	10	10	24
G. N.	2 "	0	0	0	*	15	16	25	*
A. P.	2 "	6	0	4	10	23	11	24	27
I. B.	4 "	0	0	1	*	6	7	10	*
M. B.	2 "	6	12	15	17	20	34	38	45
F. H.	2½ "	0	10	16	18	14	24	38	37.5
L. C.	2½ "	0	0	0	0	6	7	15	16
C. C.	2½ "	8	4	7	9	25	11	14	23
A. D.	2½ "	0	0	0	0	8.5	12	13	14
E. B.	2 "	0	8	0	*	13	17.5	15	*
A. S.	2 "	0	0	0	0	16	14	20	19

*No fraction obtained.

TABLE II
GASTRIC ACIDITY IN LATER PREGNANCY

PT.	DURATION OF PREGNANCY	FREE HCl				TOTAL ACIDITY			
		FAST	45 MIN.	1 HR.	1 HR. AND 15 MIN.	FAST	45 MIN.	1 HR.	1 HR. AND 15 MIN.
Mrs. M.	8 mo.	12	6	16	25	23	16	28.5	33
R. T.	7 "	18	19	23	20	26	28	33	32
M. C.	5 "	6	*	12	*	22	*	26	*
F. S.	6½ "	0	4	10	12	17	21	26	32
G. N.	7½ "	0	16	2	0	10	30	10	15
J. E.	8 "	7.5	0	0	0	37.5	12	13.7	15

*No fraction obtained.

TABLE III
RESULTS

NUMBER OF CASES	SYMPTOMS	RESULTS
10	Nausea and vomiting.	Nausea and vomiting completely stopped.
7	Nausea and vomiting.	Nausea and vomiting greatly relieved. Now vomit once a week or less.
1	Nausea in A.M. and after meals.	Nausea completely stopped.
1	Heart-burn after meals, some nausea, no vomiting.	Heart-burn and nausea greatly improved. Now occasional.
1	Nausea frequent; vomiting two or three times a week.	No improvement.

At the suggestion of Dr. Duff Allen of the Department of Surgery of Washington University, who is at present working on the formation of CO₂ in the stomach, chloride determinations were made on eight cases of this series. Dr. Allen is of the opinion that this gas is formed chiefly by the regurgitation of the duodenal contents, due to reverse peristalsis. The sodium carbonate of the duodenal contents reacts with the hydrochloric acid of the gastric contents to form sodium chloride, carbon dioxide and water. On hearing of my work, Dr. Allen felt that this low acidity might be due not to actual deficiency in the hydrochloric acid contents of the stomach, but due to a neutralization of the acid,

TABLE IV
TOTAL CHLORIDE OF STOMACH CONTENTS IN PREGNANCY

PT.	DURATION OF PREGNANCY	FASTING CONTENTS	45 MIN.	1 HR.	1 HR. AND 15 MIN.
J. D.	2½ mos.	56	41	44	51
M. S.	2¾ "	75	23	22	37
I. B.	4 "	80.3	56.1	69.7	80.9
M. B.	2 "	69.7	61.2	68.0	69.7
F. H.	2½ "	93.5	57.8	68.0	74.8
F. S.	6½ "	52.7	50.8	56.1	67.6
G. M.	7½ "	90.9	46.7	78.2	113.2
M. C.	5 "	85.0		96.9	

with the formation of sodium chloride as a result of regurgitation of the duodenal contents. If this be the case, the gastric contents should, in spite of the low free hydrochloric acid contain a normal, or possibly an increased amount of total chlorides.

In eight determinations of total chlorides carried out by Dr. Allen on these cases, it will be seen that the total chlorides were normal, or even increased (see Table IV). Although the results outlined represent data from only a few cases, they tend to show that free hydrochloric acid in the stomach contents is not due to an actual deficiency of secretion, but to the neutralization of the acid by alkaline salts regurgitated from the duodenum into the stomach. It is suggested

by Dr. Allen that the reverse peristalsis causing the regurgitation might be reflex from irritation from the early pregnant uterus. This has been previously suggested by Alvarez.

CONCLUSIONS

1. That the free hydrochloric acid and total acid of the stomach contents are lower in pregnancy than in the nonpregnant, and that this deficiency is more marked early, at the time that nausea and vomiting are most common.
2. That dilute hydrochloric acid by mouth is indicated in preventing early nausea and vomiting of pregnancy in certain cases.

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REFERRED PAIN IN THE SHOULDER IN RUPTURED TUBAL PREGNANCY

By W. C. DANFORTH, B.S., M.D., F.A.C.S., EVANSTON, ILL.

ANY means of rendering differential diagnosis easier and clearer is of value. The diagnosis of unruptured tubal pregnancy is often difficult. The recognition of ruptured ectopic pregnancy is, in the majority of cases easy. When the loss of blood has not been extreme and the signs of hemorrhage, as pallor and increased pulse rate, are consequently not so marked, error may occur. The possibility of such error is evidenced by the two cases reported here, as well as the possibility of avoiding error by the consideration of the significance of pain in one or both shoulders which occasionally occurs in intraabdominal hemorrhage from ruptured tubal pregnancy. All who have made use of transtubal insufflation to determine the patency of the fallopian tubes have noted the frequency of pain in one or both shoulders in those cases in which normally patent tubes permit the passage of gas into the abdomen. This occurs after the woman assumes the sitting posture, after insufflation. The gas seeks the highest point in the abdomen and finds its way between the diaphragm and the superior surface of the liver, causing the falciform ligament to be pulled upon. The consequent stimulation of the phrenic nerve, and its relation with nerve trunks springing from the third, fourth and fifth cervical cord segments, causes pain to be felt in the shoulders. If the woman lies down, particularly if the lower part of the body be elevated, the pain soon ceases as the gas leaves the subphrenic space.

In rupture of the pregnant tube, particularly if considerable intraabdominal hemorrhage occurs, blood may enter the subphrenic space

and cause traction upon the falciform ligament in the same manner as it is produced by the gas. This is especially apt to be so if the bleeding is large in amount and if the rupture of the tube is followed by faintness. The patient then is likely to lie flat for a time and often the foot of the bed is elevated. This allows the fluid blood to run upward along the colon on both sides, particularly the right side, and to find its way into the subphrenic space. At the time of operation enough blood is removed or escapes through the wound, even though the operator does not try to remove any great amount, that the pain is not felt after operation. Two cases of ruptured ectopic pregnancy in which shoulder pains were noted were reported by Rubin in 1923. He states that this sign had been noted in four cases in all in the Mt. Sinai Clinic.

We have noted the presence of shoulder pain in ruptured ectopic pregnancy in two cases.

CASE 1.—A woman of thirty-one, pregnant two months, was admitted to the medical service. Four days previously she had had a sudden sharp abdominal pain. She had skipped two periods but for two weeks before the onset of pain had had "spotting." On admission she complained chiefly of pain in both shoulders, particularly the right one. The physician attending, Dr. John McClellan, suspected some intraabdominal condition and asked a general surgeon to see her. The surgical consultant believed that either a cholecystitis or a beginning pneumonia with diaphragmatic pleurisy must be present, feeling that the shoulder pain could not be accounted for otherwise. Two days later I was asked to see her. The menstrual history, the sudden lower abdominal pain, followed by pain referred to the shoulders, the leucocyte count of 16,000 on admission declining to 9,000 the day of my examination, hemoglobin 65 per cent, and marked tenderness on the right side elicited by vaginal examination made a diagnosis of ectopic pregnancy very easy. On opening the abdomen a right tubal pregnancy was found with intratubal rupture. The hemorrhage had occurred at the distal end of the tube and had not been excessive in amount. About one pint of free blood was found in the abdomen. No attempt was made to remove the blood. The patient recovered uneventfully. No shoulder pain was felt after operation.

CASE 2.—This case is reported through the courtesy of Dr. W. R. Parkes and Dr. Ben H. Huggins. Woman aged twenty-eight, was pregnant six weeks. At 2 A.M. sudden severe abdominal pain followed by faintness. She was brought to the hospital at 9:00 A.M. After admission it was noted that pain was present in both shoulders. Leucocyte count was 18,000, pulse 120, temperature 97.6°, blood pressure 86/54. Diagnosis of ectopic pregnancy was not made. Exploratory operation by Dr. Parkes revealed a left tubal pregnancy with a large amount of blood in the abdomen. Recovery was uneventful. No shoulder pain was felt after operation.

In Case 1 a well-known surgeon and teacher was led to consider upper abdominal or possible thoracic pathology by reason of the shoulder pain which he did not associate with trouble in the pelvis.

In Case 2 the shoulder pain introduced an element of doubt which caused the diagnosis to remain undetermined although she was seen by an experienced general surgeon. It is true that neither the surgeon who saw the first case nor either of the attendants in Case 2 had had

any occasion to become familiar with the sensations of patients who have undergone tubal insufflation.

The symptom of shoulder pain in intraabdominal bleeding from ectopic pregnancy, properly understood, may well be a help rather than a hindrance in diagnosis and may be of value in differentiating this condition from other abdominal conditions. It seems proper again to draw attention to it.

708 CHURCH STREET.

REPORT OF A CASE OF ACRANIA CAUSING MALPRES- TATION AND ACCIDENTAL HEMORRHAGE*

BY A. J. FLEISCHER, M.D., NEW YORK, N. Y.

KNACKSTEDT, in 1791, described the anatomy of a fetus born without brain and skull. Many others since have reported such cases of anencephaly, acrania, etc. Thoms in 1918 reported a case of anencephaly, where there was a marked familial prevalence. In 1924, Campbell and Willits reported a case of anencephaly diagnosed before birth, with the aid of radiography. DeLee points out that, "during labor the possibility of a monstrous formation is to be considered, with other things, when the internal examination reveals atypical findings." Another quotation from DeLee: "An anencephalic monster might easily cause confusion with placenta previa, prolapse of the cord, simple face presentation, or breech presentation." The following case of acrania with meningocele fully illustrates these two quotations.

CASE REPORT

Mrs. F. H., aged twenty-six, primipara, was admitted to the Bronx Hospital, July 20, 1925, complaining of pains in the abdomen and vaginal bleeding. Family history revealed death of father due to meningitis, at the age of fifty-three; two brothers died in infancy, cause unknown; two brothers and three sisters living and well. There is no history of monstrosity in either the patient's or her husband's family. Patient had measles in childhood and typhoid fever at the age of eighteen. Menstruation began at fourteen, every thirty days, of four days' duration, and moderate bleeding. She felt quickening on April 28, 1925. Urine always negative, blood pressure never above 115/68. Measurements: Interspinous, 20; intercerital, 24.5; left oblique, 19; right oblique, 20; external conjugate, 18; diagonal conjugate, 11.5.

Labor pains began at midnight. Membranes ruptured at 3:00 A.M., after which patient noticed spotting. She was admitted at 4:20 A.M., having strong pains about every five minutes. The house obstetricians reported: eight months' gestation; dilatation three fingers, membranes ruptured, breech presenting, and constant bloody oozing from the vagina. At 5:00 A.M. the cervix was markedly thinned out, four fingers dilatation, face presentation, left mentoposterior. Fetal heart was 140, heard in right lower quadrant of the abdomen, and good quality. No placenta could

*Presented at a meeting of the Obstetric Section of the New York Academy of Medicine, January 26, 1926.

be felt, but it was believed the bleeding might be due to premature separation. The fetal mouth imparted to the examining finger a sense of unusual largeness and irregularity, suggesting harelip. A protruding mass was felt over the right orbital fossa. The findings pointed to a monstrosity as accounting for the malposition. Although the pulse was 120, where it had been 88 on admission, it was decided to wait, since the general condition was good, for the cervix to dilate, if not completely, to a stage where manual dilatation would be justified. At 5:30 A.M. she began to feel restless, pulse had gone up to 140, and bleeding was more profuse. Immediate delivery was decided upon. The cervix was almost completely dilated, and with the aid of a little manual manipulation, appeared sufficiently out of the way to effect delivery by means of version and extraction. While completing delivery of the after-coming head, a large meningocele was noticed, to which the fetal membranes were strongly adherent. The free hand placed in the vagina, while supporting the fetus with the other hand, immediately came upon the after-coming placenta, which had apparently already been separated and was being extracted along with the after-coming head. Continuing extraction with the utmost care, a living female child and placenta were completely removed, preserving the attachment of the fetal membranes to the meningocele. Uterine bleeding was controlled with pituitrin and aseptic ergotol, hypodermically. The child lived for two hours.

The dome of the calvarium was missing. The brain was included in a meningocele that extruded from the opening in the skull. From the apex of this meningocele, there extended a fold of membrane to the amnion reflected from the root of the cord at its insertion in the placenta. This insertion was eccentrically placed, practically at the outer margin of the placental circumference. The maternal side of the placenta, corresponding to the fetal side where the cord was inserted, indicated that the separation had taken place at this point, which was the seat of the hemorrhage. The brain of the fetus was unusually well developed, considering the fact that in this type of monstrosity, this is not usually the case. There was marked exophthalmus of the right eye; also double harelip and cleft-palate. Syndactylism was present in both lower and upper extremities. The thymus was large, as one would expect in a newborn. Heart was normal, lungs were atelectatic. Examination of the abdominal and pelvic organs revealed no abnormalities.

It would appear that, with every uterine contraction, traction on the adherent amnion and placenta resulted in premature separation, with consequent accidental hemorrhage. For the same reason, there was countertraction on the head, preventing flexion, with resulting extension and face presentation.

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REPORT OF A CASE OF CONGENITAL MALFORMATION AND ARRESTED DEVELOPMENT OF THE COLON*

BY GEORGE KIRBY SIMS, B.Sc., M.D., JOPLIN, MO., AND HARRY L.
MEYERS, M.D., CHICAGO, ILL.

BABY R., a girl, one month premature, breech presentation, weight 1833 grams, delivered at the Chicago Lying-In Hospital, February 24, 1925, was considerably asphyxiated. With catheter a moderate amount of mucus was removed from the trachea. After a subcutaneous injection of 0.5 c.c. of alphalobelin the child made a satisfactory recovery.

Following each feeding for the first sixty hours the baby regurgitated. It passed nothing per rectum. After the first twenty-four hours there was a moderate amount of icterus which, with the ingestion of water at frequent intervals, cleared up during the succeeding thirty-six hours.

Physical examination revealed an asthenic baby with the skin of the extremities somewhat wrinkled. There was no apparent discomfort; the child slept well, and cried very little, though lustily. The eyes, ears, nose, and throat were normal. There was no adenopathy. The heart was regular and no murmurs could be heard. The chest revealed no abnormal findings. The abdomen was greatly distended, especially in its upper half, where it was highly tympanitic. The genitalia were normal.

A rubber catheter was passed into the duodenum without any difficulty. Further, a catheter was passed per rectum to a distance of about 10 centimeters, when it met with resistance. A tentative diagnosis of acute obstruction at the ileocecal junction was made.

The blood Wassermann was negative; likewise, that of the mother and father. A barium mixture was injected per rectum with the catheter left in situ, reaching to the point of resistance, as previously described. The roentgenogram revealed a light colored, ribbon-like band 0.5 centimeters width, extending from the region of the ileocecal junction, upward on the same side a distance of four or five centimeters, then across the abdomen just below the umbilicus to the left costal arch, and downward to midline and to the lower part of the pelvis. The catheter was seen to lie in a straight line directly over the spine.

After removing the catheter the patient was returned to its crib for six hours, during which time nothing was passed per rectum. A second roentgenogram failed to reveal the shadow in that part of the intestinal tract in which the catheter lay, as was shown in the preceding film.

Operation, February 27, 1925.—The abdomen was opened through a median incision extending from symphysis to umbilicus. The ileum, distended in practically its entire length to four or five centimeters in diameter, came into view. It was purplish in color, except for five or six centimeters at its distal end, which was of a pinkish hue and tapered down to near its normal size.

The appendix was free, and of normal size and color, though in malposition and attached to the distal end of the ileum. There was no constriction at the pylorus. The liver extended to the iliac crest. The urinary bladder, uterus, and tubes were normal. A white, firm, cord-like structure, about 5 centimeters in diameter, with no palpable lumen, was found beginning at the ileocecal junction, passing upward and diagonally across the abdomen just below the umbilicus to the left costal arch, then down to the crest of the ilium of the same side. From here, this structure,

*Read before the Jasper County Medical Society of Joplin, Mo., February 2, 1926.

which proved to be the colon, though it had no vestige of a mesentery in any of its entire length, passed downward to midline and in this plane into the pelvis. It was not only impossible to pass meconium through the ileocecal valve, but even gas from the distended ileum could not be forced through.

A rubber catheter was passed per rectum, but was observed to stop after it had entered the gut a distance of about 10 centimeters. A puncture was made into the small intestine to permit the escape of gas, after which the wound was closed by a Connell suture. The viscera were replaced in the peritoneal cavity; the peritoneum, muscles and fascia were closed with continuous sutures of catgut No. 2 and the skin with interrupted linen.

Postmortem examination revealed no abnormality of the patient other than that heretofore described. The entire colon was removed and sectioned at 2.5 centimeter intervals. A section was made from each of these segments. Microscopic examination of the sections made from the first few segments revealed no lumen. In the remainder of the gut the diameter of the lumen was of a graduated size, ranging from that of the diameter of an ordinary brass pin to 1 millimeter, except the rectal portion, which was about a centimeter in diameter.

In reviewing the literature, we have found eleven cases which, in any manner, bear resemblance to the one being described.

The colon of arrested development (*microcolon*) is of unusually rare occurrence and is not discussed in standard works.

In the cases which follow, the writers confine themselves to a description of the case with no discussion of the probable cause or development of the anomaly or malformation.

In Kennedy's⁵ case the atrophied intestine was removed from a girl of twenty years. Two years preceding the operation a subcostal abscess in the right side was diagnosed as tuberculous. Three weeks preceding the operation a fecal fistula developed. A resection was done, followed by a lateral anastomosis about the middle of the transverse colon. Examination of the muscle fibers of the atrophied ascending colon proved that it was of congenital origin.

Walker⁶ reports on three consecutive infants in one family, all of which succumbed shortly after birth. No autopsy had been permitted, but two had come to operation. In each of these there was imperforate anus, and at operation no large intestine could be found. In one, on opening the abdomen, a firm, cord-like structure about 0.5 centimeters thick was found running up from the occluded lower gut and attached to the abdominal wall by a small fold resembling a rudimentary mesentery.

Autopsy in Gellert's³ case showed that the large intestine was represented by a pale, contracted band which would admit only a small-sized probe. From the diminutive cecum downwards, the colon was markedly attenuated, poorly developed, and in a gradual decline, especially so below the hepatic flexure. A minute appendix was present. A thin plug of inspissated mucus was found blocking the lumen of the gut in the region of the splenic flexure. The large intestine was present in its entirety and no atresia or occlusion, apart from the plug of mucus, was observed in any part of the colon. The condition of the large bowel was obviously due to malformation, *microcolon*, a developmental error in early fetal life, and did not represent a state of collapse below an obstruction.

Stowell⁷ reports a case of arrested development of the intestinal tract in which the stomach was 6 centimeters long with a constricted pylorus. The duodenum was dilated for 6 centimeters until another constriction cut it down. Beyond this point the intestine was a large pouch, 25 centimeters long, ending abruptly and blindly. There was, then, a cord-like remnant of 10 centimeters of gut, ending in the atrophied remainder of the ileum which was 1.5 centimeters in diameter and

collapsed. The appendix was 4 centimeters long and was attached to the first part of the duodenum. The colon, except the rectal portion, was less than a centimeter in diameter. The rectum was pervious but small.

Coley¹ reports a case in which the small intestine was dilated 3.5 centimeters to within 20 centimeters of the cecum. The remainder of the bowel was like a tape.

Craig² reports a case of the colon atrophied to that of the size of a quill.

In Horn's⁴ case the colon was a solid, cord-like structure and showed throughout its entire length, from the cecum to the rectum, a high grade stenosis. Topographically, it was correctly located, but only of lead-pencil thickness. This author maintains that his case is of greatest rarity; he has found only one other similar case reported, that by Brodelet, in 1854, which showed atresia at the cecum, below which the entire intestine was very much contracted. Cases showing atresia in parts of the intestinal tract are of more frequent occurrence. The author adheres to Kreuter's theory, that congenital, colonic anomalies find their explanation in an arrest, and in the persistency of arrest, of embryonal development.

LeConte, Lee and Downs⁶ report a case of arrested development of the alimentary canal in an adult. In this instance, however, the pathology involves a malposition and a malformation of the colon with an omentum attached. But the lumen of the gut rather than being narrowed, was very decidedly enlarged and more nearly resembled the condition of megacolon.

SUMMARY

1. Walker,⁸ in referring to two of his cases which came to operation, says no large intestine could be found. His statement is somewhat misleading, inasmuch as he states that the abdomen was opened in only one case. And in this one there was a cord-like structure with a rudimentary mesentery attaching the cord to the abdominal wall. After all, he does not tell us whether there was a lumen in the gut.

2. Coley¹ also leaves us in doubt in the matter of a lumen in the rudimentary intestine referred to in his case, saying, merely, that the colon in his case was like a tape.

3. Horn⁴ reports that the colon in his case had a high grade stenosis.

4. The other writers in reviewing their cases reveal that there has been either an arrested development of the colon with a consequent stenosis or a congenital malformation.

5. A review of all the cases from the literature available in the John Crerar Library of Chicago shows that case not only presented a congenital malformation and arrested development, in that there is only a very small cord-like structure with no lumen in the first third of its entire length and a high grade stenosis in its remainder, but that there is a total absence of a mesentery.

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SPIROCHETAE IN THE THYMUS GLAND. A CASE REPORT

BY JAMES R. MCCORD, M.D., ATLANTA, GA.

(From the Department of Obstetrics, Emory University School of Medicine)

WE BELIEVE the following case, showing the uncertainty of syphilis and pregnancy, is worth reporting.

B. D., a colored primiparous woman, was admitted to the hospital January 10, 1926. She was an eclamptic, having convulsions, and was not at term. The maternal prelabor Wassermann was negative. Labor was induced by a bag, and she delivered a macerated baby, weighing four pounds, one ounce. The placenta showed none of the histologic evidences of syphilis. An x-ray picture of the bones of the baby

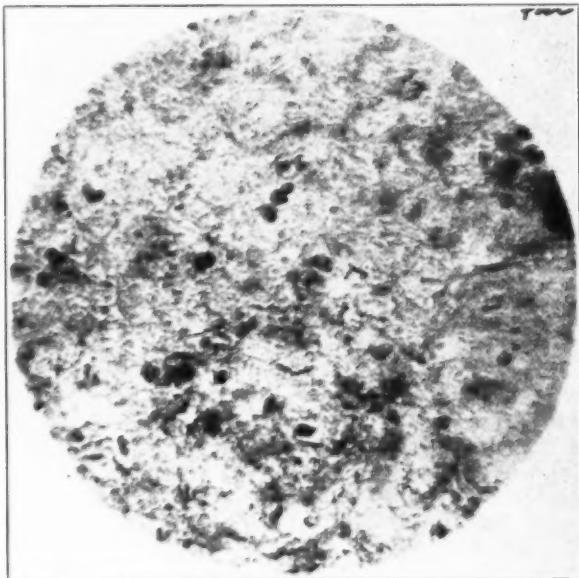


Fig. 1.—Showing Spirocheta pallida in the thymus.

did not show any of the changes that are believed to be characteristic of syphilis. A dark-field examination of liver secretion did not show the spirochetes of syphilis (this may have been due to the maceration of the fetus, or perhaps the organisms were overlooked). The fetal tissues removed at autopsy were stained by Levaditi's method. Thorough search revealed no organisms in the liver, spleen, kidneys, adrenals, heart, or aorta. They were found in the thymus in large numbers. We know that any silver stain, for the organisms of syphilis, is unreliable; but all of these tissues were carried through at the same time, and the only conclusion we can draw is, that the organisms were only present in the thymus gland. If present in other tissues, their numbers must have been exceedingly small.

61 FORREST AVENUE.

Society Transactions

OBSTETRICAL SOCIETY OF PHILADELPHIA

MEETING OF FEBRUARY 4, 1926

THE PRESIDENT, DR. NORMAN L. KNIPE, IN THE CHAIR

DR. STEPHEN E. TRACY presented a specimen from an **Extensive Myomectomy** and referred to the safety with which this can be done under modern methods.

Mrs. Chas. M., aged thirty, married two years, never pregnant. Menstruation began at the age of fifteen, regular every twenty-eight days, and lasted six to seven days. At times the menstrual period was painful for a few hours until the flow was well established. For the last year the patient complained of pain and sensation of fullness in the left side of lower abdomen and pelvis. Examination of the abdomen was negative. Posterior to the cervix there was a hard, smooth mass extending to the left side, which filled the pelvis, and above which some small nodules could be made out.

A diagnosis was made of fibromyoma and operation was recommended.

The patient was most anxious to become a mother and was promised the uterus would be saved if possible. A large nodule measured 12 by 6 cm., and 10 other nodules, varying in size from 4 by 3 cm. down to 1 cm. in diameter, were removed. At the completion of the operation the uterus was about normal in size and of normal contour. Examination just before the patient left the hospital showed the uterus to be of normal size, normal in position, and freely movable.

In answer to Doctor Outerbridge, whether the scar in the uterus would stand a labor, Dr. Tracy said he had no definite data on cases in which the endometrial cavity was opened for a myomectomy. If the wound in the uterus is carefully sutured and if the patient has a normal convalescence and primary union, there should be no trouble from the scar during labor.

DR. WILLIAM W. VAN DOLSEN described **A New Type of Obstetrical Forceps.**

Feeling that there was no excuse for the fenestrated blade and having seen many lacerations of the child and mother following its employment, he selected the solid blades used in the Tucker-McLane instrument as a basis for this instrument. Particular care is used in beveling the edges of the blades and shanks, thus leaving the least possible cutting surface.

The pelvic curve of the Dewees' forceps being the greatest and giving more of the axis traction principle, was therefore copied. The lock and cross shanks of the Elliott instrument cause less distention of the vaginal floor with subsequent danger of laceration, and so it was considered more desirable as compared with the Simpson forceps.

The Elliott adjustment, for holding the handles at a certain distance and avoiding undue compression on the fetal head, was used with the addition of a notch filed on the adjustment bar. This notch is placed at a point guaranteeing the adjust-

ment of the tips of the blades at 1.5 cm., and the diameter of the blades at their central point at 10 cm., the largest diameter of the fetal head. By turning the adjustment past the notch the diameter between the blades may be altered.

Noting that on all other forceps the handles are fitted with projecting wings, so small as to be painful and tiring to the fingers, he made the handles on his forceps large enough to hold comfortably two fingers on either side.

DR. RICHARD C. NORRIS believed that attempts to do away with the principle of axis traction was distinctly a backward step. He regarded the increased concavity of the blades of this instrument as being a distinct disadvantage from the standpoint of compressing the child's skull and increasing the intracranial hemorrhages which we now know are the important factors in cases of grave asphyxia.

DR. GEORGE M. LAWS read a paper on **Ureteral Obstruction in Women.**
(For original article see page 802.)

DISCUSSION

DR. GEORGE W. OUTERBRIDGE agreed with Dr. Laws that it is perfectly feasible to use these bougies through a water distention, indirect vision cystoscope. He says it should be remembered that a diagnosis cannot be made in these cases on one examination.

Dr. Outerbridge said that in many cases obstruction to the catheter is found at one time, while at another time the catheter passes without any difficulty. He described one very striking personal case. The patient had symptoms suggesting ureteral and kidney trouble and he could not get a No. 6 bulb through either ureteral orifice, but managed with great difficulty to pass a No. 5. It went so tightly that the ureteral orifice became blanched and puckered and the woman had a terrific reaction afterward. She was cystoscoped six days later and both ureteral orifices were edematous. Six months later she returned for treatment and it was possible to pass a No. 10 bulb without any trouble. The relation of pyelitis to obstruction is one of great interest. Pyelitis will not clear up in the presence of definite obstruction. In pyelitis of pregnancy the passage of a ureteral catheter clears the symptoms very quickly, and no doubt obstruction is relieved and drainage produced. But does the urine clear up bacteriologically? A great many of these cases if examined long after the termination of pregnancy will have colon bacillus in their urine. Dr. Outerbridge referred to one patient, a woman, who came in with marked pus in the urine, no definite obstruction of either ureter, cloudy urine on both sides; one side appeared normal in pyelogram, the other showing a moderate but definite hydronephrosis. There was a slight hang to the No. 12 bulb on the hydronephrotic side at about 22 cm. above the orifice; on the other side there was no obstruction at all. That woman received ten pelvic lavages and ureteral dilatations at intervals of ten days to two weeks. The pus and her symptoms have cleared up but every examination still shows colon bacillus in the urine although the urine is perfectly clear. There is no demonstrable dilatation of the ureter, yet the pyelitis is, so far as bacteriologic study goes, as it was at the beginning.

Dr. Laws referred to the fact that the back pressure in the kidney parenchyma existed without dilatation of the kidney pelvis. It might be asked whether that lack of dilatation of the pelvis was a pathologic finding after the kidneys were removed, or how it was demonstrated?

Dr. Outerbridge also had a case in which there was an obstruction of the ureter that went on to complete disappearance of all evidence of the ureter cystoscopically. Of course cases of so-called "closed kidney" are not very rare, but

as a rule at least the ureteral orifice remains and can be seen in the bladder. This patient recently came in suggesting trouble in the left kidney and a cystoscopy showed apparently an instance of single kidney. There was no left ureteral orifice whatsoever, the left bladder wall being absolutely smooth. He had cystoscoped this woman four years before and she had then a normal left orifice. On operation she proved to have a tuberculous left kidney with cyst formation and calcification. That of course is the ultimate finding of ureteral obliteration due to tuberculosis.

DR. J. STUART LAWRENCE asked what percentage of acute obstruction existed.

DR. H. M. GINSBURG said he had made a careful study of ureteral strictures and felt the same as Dr. Laws about diagnosis. He uses the direct method of cystoscopy with a modified Kelly cystoscope and the patient in the knee-chest posture. In order to exclude stricture of the ureter it is necessary to use a No. 9 or 10 catheter, or a small catheter upon which is placed a wax bulb equivalent to 10 mm. The majority of the cystoscopes will only allow the use of a catheter as high as No. 7; it was therefore taken for granted that this was the normal caliber of the ureter. Strictures of the ureter are found very frequently in the Gynecological Department of the Jefferson Hospital. Patients come in with indefinite abdominal pain. Pelvic examinations, gastrointestinal and other studies are made and the origin of their symptoms is determined only after careful urologic study. If their pain happened to be on the right side, the majority of these patients have had their appendix removed. Of course to make an absolute diagnosis of stricture of the ureter it is necessary to use a wax bulb or to make a pyelogram. In the majority of the patients the diagnosis can be made by finding a definite obstruction to the larger sized catheters. It is surprising to find the excellent urinary output in these cases even where there is a moderate degree of hydronephrosis. In the majority of the women who suffer from frequency of urination, the trouble is usually limited to the trigone, in other words they are suffering from a trigonitis and not from a cystitis as we so commonly surmise. If one examined these patients by the indirect method, the ureteral orifices would appear normal, due to the magnification of the fluid in the bladder, and if one examined the same patient by the direct method the orifices would appear small and round and sometimes pouting. This condition is often secondary to the trigonitis or follows a ureteritis, and for this reason obstruction is often at the ureteral orifice.

DR. CHARLES MAZER said that in addition to the "hang" on the bulb catheter, the ureterogram is the principal diagnostic feature in ureteral stricture. It is impossible to conceive of the presence of a stricture without dilatation of the ureter above the point of obstruction. He injects the sodium iodide with the patient in the recumbent position, and withdraws the catheter when the patient is in the extreme Fowler position (almost erect) so that the solution fills the ureter by gravity and not by pressure from below. He believed that the reason Dr. Outerbridge failed to obtain negative cultures after the urine was made free from pus was his failure to eradicate primary foci of infection. A careful study of the nose, throat, and sinuses as well as the uterine cervix must be made in order to eliminate these as causative factors.

There are cases of ureteral kinks attributable to abnormal mobility of the kidney, usually occurring in women who, for some reason, have lost much weight. A pyelogram made in the extreme Fowler position will show a difference of from two to four inches from that made with the patient in the recumbent position. These cases are usually associated with dilatation of the kidney pelvis and ureter above the point of kinking. Dr. Mazer treated these patients by rest in bed in the

Trendelenburg position for six weeks, and by forced feeding. On discharge, proper abdominal support was provided.

DR. LAWS (closing) said in answering Dr. Lawrence's question, that he had no knowledge as to how often inflammatory stenosis follows pyelitis, and did not know how one could determine it. When the pyelitis clears up one does not feel like subjecting a patient to an examination of this kind without a reason, for if the patient has a fairly normal urinary tract a medium-sized catheter will cause little or no reaction, but if the patient has an obstruction in the ureter and a full-sized instrument is put in she will have a reaction which may be quite severe. Answering Dr. Outerbridge's question about the pathologic material shown there, it is true that of the seven cases pictured there were two in which the kidneys had been suspended; they were biopsy sections and so far as one could tell clinically, without a pyelogram, there was no recognizable hydronephrosis. Of the other five, some had pyonephrosis, others had not. These parenchyma changes may occur in the absence of dilatation of the pelvis. Dr. Ginsburg spoke of congenitally small ureteral orifices. Dr. Laws said he was sure there were two or three patients in that group who had very advanced trouble. One patient had had a suspension and she had a normal appearing orifice, but it was so small that he was unable to pass a catheter of any size. When first seen she had a huge pyonephrosis. Of course pyelograms were not made in the cases that had pyonephrosis and conditions requiring nephrectomy; there was no reason for it. In cystoscopic work Dr. Laws always acted on the basis of doing the minimum that was necessary for the welfare of the patient and it left him with a dearth of pictures. In the years in which some of this work was done a pyelogram was not a thing to be done without a little consideration because he was not always using an innocuous medium like sodium iodide. Making pyelograms should not be a routine procedure.

Dr. B. G. M. ASTLEY read a paper on **Spinal Anesthesia**. (To appear with its discussion, in the January issue.)

MEETING OF MARCH 4, 1926

DR. BERNARD MANN reported a case of **Primary Carcinoma of the Ovary**.

Although primary carcinoma of the ovary is quite uncommon the solid type is rarest. Mrs. S. J., widow, colored, aged forty-six, was admitted to the Howard Hospital, December 20, 1925, complaining of pains and swelling of the abdomen, vomiting, and dyspnea. She was confined to her bed for about four months. Menstrual history was normal; menopause two years ago. She had seven children, four of which were premature. Blood Wassermann, four plus; R. B. C., 2,500,000; Hb, 60 per cent; W. B. C., 15,000. Blood pressure, 84/50.

Patient was poorly nourished. No edema of the extremities or face. Murmurs both at aortic and mitral areas. Bases of both lungs revealed fine rales. Abdomen was markedly distended. Movable dullness. A solid mass could be outlined in the lower abdomen, reaching above the umbilicus. On January 5, 11 pints and 13 ounces of bloody-colored fluid were removed from the abdomen, which relieved the patient considerably. Patient required tapping again 5 days later and 8½ pints of fluid were removed.

On January 15, under local and sacral anesthesia, the abdomen was opened through a midline incision. About 10 pints of bloody-colored fluid escaped. The tumor was adherent to the peritoneum, omentum and transverse colon, and occupied the site of the right ovary. The right tube was small. The uterus was about

normal size, and the left tube and ovary were normal. After removal of the tumor, there was marked bleeding from its bed and the pelvis was packed. The



Fig. 1.—Carcinoma of ovary. Low power.

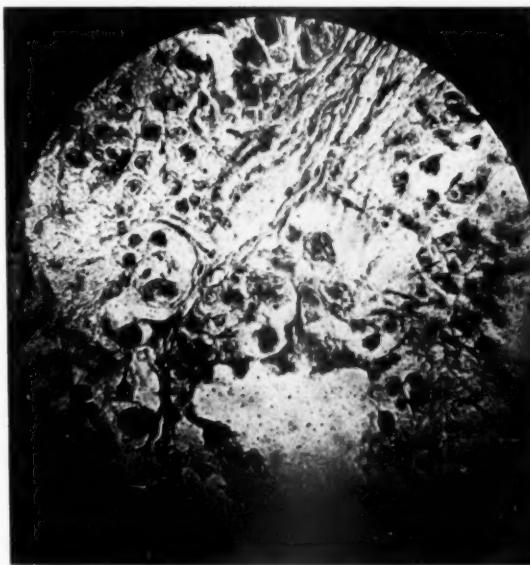


Fig. 2.—Carcinoma of ovary. High power.

patient made an uneventful recovery with no evidence of reaccumulation of the fluid. She was given digitalis and mixed treatment.

At time of discharge on February 17, she was able to walk about, free from any pain or discomfort, and entirely relieved of her dyspnea, vomiting, and abdominal distention. Blood pressure 114/70.

The gross specimen submitted for examination was a large lobulated and nodulated tumor, largely solid in type, but with a few small cystic areas in it, about the size of an adult human head and weighing 2200 gm., with a thin, pale, almost translucent capsule, and fleshy, slightly spongy texture of the interior tissue. Microscopic examination showed a thin, fibrous capsule, and an alveolated arrangement of the tumor tissue, the alveolar walls fibrous and thin, and the spaces lined and more or less filled by comparatively large epithelial cells, often columnar in type where lining the alveolar walls but were modified by mutual pressure in the alveolar interiors. Extensions of these cells through the matrix were frequent, and examples of free cellular proliferation into the alveolar spaces from the lining as papillary bunches common. Occasional small cysts containing a pseudomucin were seen; and sometimes this serous material along with the epithelium served to fill the spaces. No definite ovarian structure was encountered in the sections examined. *Diagnosis:* Adenocarcinoma of the ovary.

DR. LEWIS S. SCHEFFEY reported a case of Spindle-Celled Sarcoma of the Ovary With a Twisted Pedicle, removed by Dr. Brooke Anspach.

The patient, Mrs. R. W., married, thirty-seven years of age, was admitted to the Jefferson Hospital because of acute, paroxysmal pain in the left lower abdominal quadrant, accompanied by a palpable enlargement. She exhibited profound weakness and was rapidly approaching collapse.

The condition had developed rather suddenly on the morning of admission, beginning with acute abdominal pain, more marked on the left side, and increasing in intensity and severity; an hour or so later, sudden weakness occurred, amounting almost to collapse, and these symptoms, together with the finding of a palpable enlargement in the left lower abdominal quadrant, justified the diagnosis of ovarian cyst with a twisted pedicle.

Operation revealed a solid tumor of the left ovary, 10 cm. in its longest diameter; two complete twists of the pedicle; hemorrhagic infiltration and enlargement of the left fallopian tube, the size of a carrot; the other pelvic organs appeared normal, with the appendix uninvolved. A left salpingo-oophorectomy was performed, with posterior fixation of the left round ligament. A Baldy-Webster fixation of the right round ligament, and appendectomy were also done, and the patient made an uninterrupted recovery with an uneventful convalescence.

The pathologic report showed the tumor to be a spindle-celled sarcoma of the ovary. Important in the history was the fact that the patient had noted progressive abdominal enlargement for three months prior to this attack, but had never experienced any pain, and had never mentioned the matter to anyone. Menstruation had been irregular for three years past, occurring every one to three months, normal in amount, with some dysmenorrhea. She had been pregnant four times, with two miscarriages and two labors, one a twin birth; the last pregnancy occurred five years previous to this attack. Otherwise the history, both personal and family, was uneventful.

DR. JOHN H. GIRVIN reported an instance of Unusually Large Ovarian Cyst.

Mrs. M. K., aged forty-six, white, married, with 3 children, no miscarriages, was admitted to the Presbyterian Hospital, June 1, 1925. She had always been well until five years ago, when she began to have nausea and vomiting spells after hard work. Three years ago she noticed abdominal swelling, first in loins; walking has been an effort for the past year; no pain; enormous appetite but no indigestion; bowels regular; urination normal; menses regular until three years ago, then some irregularity for one year and no menses for past two years. Two years ago, she weighed 142 pounds; usual weight 137 pounds; she weighed 237 pounds at time of

admittance, although her face and limbs had been losing weight since she had influenza nearly two years before.

The patient was a thin, poorly developed and poorly nourished woman with emaciated, drawn face. She had to be propped up in bed. The most prominent feature was an immense protrusion of the abdominal wall which was symmetrical and smooth, with skin very tense. The swelling began posteriorly in both flanks and extended far anteriorly. The circumference at the umbilicus was 63 inches, and from the sternoxiphoid joint to the symphysis pubis measured 36 inches.

There was a marked fluid wave within the tumor; percussion note over entire dome was dull. None of the intraabdominal organs were palpable. Peristalsis was sluggish. The veins passing over the dome of the tumor were flattened or depressed. The cervical vessels pulsated visibly. The chest showed limited symmetrical and equal expansion; thoracic type of breathing. There was no diminution of the percussion note. Sounds were well transmitted, with no rales or adventitious sounds. Apex beat in left fifth intercostal space. Rate, normal; rhythm, good; apex beat, soft; no shock or thrill. No enlargement of cardiac dullness was noted. No murmurs. Marked edema in both legs, especially along tibia and about the ankles. No cyanosis; no edema of face.

Blood pressure 154/106; urine normal; P. S. P. 15.5-20; blood count: Hg, 76 per cent; R. B. C., 3,820,000; W. B. C., 6,800.

June 5, 1925: The patient had to be held in a sitting position on the operating table and the enormous abdomen supported on both sides.

Incision: Midline below and up to umbilicus. Adhesions of the cyst to abdominal wall, slight in extent, were broken down by the hand. Cyst was punctured with trocar. As much of the fluid as possible was drawn off into receptacles, but part escaped into the abdominal cavity and onto the floor. It was of a seromucous consistency and light brown color, fairly clear. After a great part of the fluid had been withdrawn, the cyst was removed from the abdomen. It was found to be attached to the left ovary by a pedicle 2 or 3 inches long and only one-half an inch thick, which was twisted. Pedicle was ligated and cut, and cyst removed. Right ovary was then removed by ligation of mesovarium.

During the operation which lasted forty-five minutes, the blood pressure was at the start 135/90; during freeing of adhesions 145/90; during tapping it dropped to 120/70, then 110/60; upon removal of cyst and traction upon pedicle 70/40, then 60/0. An intravenous saline infusion with adrenalin was given and the pressure became 75/0 then 160/100, and after dressing and removal to bed, 110/70. The pulse rate was 90 at start of operation; 105 until intravenous solution was given, when it rose to 115 and was 120 when she was removed to bed in unusually good condition, considering that the temperature in the operating room was 107° during the operation.

After closing the abdomen with interrupted silkworm gut sutures, the most unusual appearance presented itself as the lower ribs had been so distended and the abdominal wall so relaxed that it fell flat against the spine and looked like a curtain of skin covering the diaphragm. The heart beat was distinctly visible. This depression was packed with sixteen ordinary-sized laparotomy pads bound tightly with broad adhesive strips.

She made an unusually uncomplicated, easy, and rapid recovery. Broad adhesive bands were put around the lower ribs and these were tightened every day. She was kept in bed for twenty-six days and went home on July 7 in good condition, weighing 116 pounds. A report from her, dated March 1, says, "I never felt better in my life and now weigh 138 pounds."

The cyst and contained fluid weighed 122 pounds, the fluid measuring 52 quarts. Specimen measured 51 by 48 by 43 cm., with numerous broken up adhesions. It was unilocular. Thickness of the wall varied from 1 to 4 mm. In the thickened

part, the wall showed externally, dirty greenish discoloration over an area roughly 33 by 31 cm. Over this greenish discoloration area there was hyaline-like material adherent to the surface. The pedicle was very thin, measuring only 9 mm. in diameter. The tube was stretched over the cyst, and measured 21 by 5 mm.

In the broad ligament there was a fusiform thickening, measuring 5 by 1.5 by 1 em. and resembling ovarian tissue.

At a point 14 cm. from the fimbriated end of the tube there was imbedded in the wall of the cyst, an irregular, nodular solid tumor mass, which measured 20 by 19 by 6 cm. It was polycystic, with irregular areas between the cysts.

Histologic examination showed in the thick portion of the wall papilliferous cystadenoma which had undergone carcinomatous degeneration.

The points of interest seem to be the unusually large size and weight of the cyst (in a brief review of the literature only nine cases larger could be found); the comparatively slight symptoms and discomfort before operation; the reactions during operation, especially during such a high temperature, and the very easy recovery.

DISCUSSION ON THE JOINT REPORTS

DR. PHILIP F. WILLIAMS asked about the condition of the opposite ovary in these cases of primary carcinoma and sarcoma of the ovary.

DR. JOHN A. MCGLINN said that the incidence of recurrence in the opposite ovary was rather high in his experience. He had had two or three cases of apparently normal ovary, particularly in sarcoma, followed by recurrence on the other side.

DR. B. MANN stated that in his case the opposite tube and ovary were normal in size. The uterus was slightly enlarged. The uterus, tube, and ovary were all markedly injected. The condition of the patient at the operation was such, on account of the severe hemorrhage and asthenia, that it was necessary to finish as quickly as possible; therefore, the uterus was not removed.

DR. LEWIS C. SCHEFFEY said that in his case the opposite ovary was apparently normal, and it was not removed.

DR. DAVID L. BELDING, of Boston, by invitation, read a paper entitled **The Effect of Treatment of Syphilitic Pregnant Women Upon the Incidence of Congenital Syphilis.** (For original article see page 839.)

DISCUSSION

DR. JOHN A. KOLMER said that in his opinion the excellent statistical analysis presented by Dr. Belding confirmed our general knowledge of the importance of congenital syphilis although he did not share his somewhat pessimistic opinion of the influence of specific treatment of the expectant syphilitic mother during pregnancy. The mere fact that syphilitic women may bring forth almost as many living children as nonsyphilitic women is not acceptable evidence that the children of the former have escaped contracting the disease. The clinical diagnosis of latent congenital syphilis is frequently a very difficult problem, calling for the cooperation of not only the serologist but likewise of the roentgenologist and other specialists. In other words the incidence of congenital syphilis is higher than that indicated by the Wassermann test alone and he knew from experience that this test frequently yielded falsely negative reactions in cases of clinically latent congenital syphilis. Dr. Kolmer claimed, however, with pardonable pride, that his own complement-fixation test based upon studies on the standardization of the Wassermann reaction, detected a much larger percentage of these cases than the ordinary Wassermann method. He believed the same could be said of the Kahn precipitation test and in his experience

the serum diagnosis of congenital syphilis is best served by using both tests with the serum of mother and child.

Dr. Kolmer believed that the thorough and proper treatment of the syphilitic woman during pregnancy has proved to be an efficient, sensible, and practical method for preventing prenatal infection of the unborn and particularly if the woman has been infected within five years of her pregnancy. If her syphilitic infection is of longer duration, she may give birth to a nonsyphilitic child, provided nothing has occurred during her pregnancy to stir up the latent infection. But even under these circumstances great care is required in the serologic and clinical examination of the child before one is warranted in expressing the opinion that the child has apparently escaped infection. Dr. Kolmer believed it a wise and sound practice to administer antisyphilitic treatment to every syphilitic woman during pregnancy, regardless of the question of the clinical latency of her disease. It must be stated, however, that the treatment of chronic latent syphilis in the expectant mother presents certain problems and that the choice of drugs and their administration should be such as to reduce to a minimum the chances of producing Herxheimer exacerbations and the possibility of transmission of the disease to the fetus.

In practice one of the most difficult problems is to handle a woman during pregnancy when syphilis is discovered in the father. In other words it is frequently difficult to decide whether or not the expectant mother should be treated and if so, how this should be done, without informing her of the nature of the treatment, in order to preserve domestic peace and happiness. However, this usually can and should be done rather than deprive the unborn child of a chance to escape infection by proper treatment of its mother.

In Dr. Kolmer's opinion the birth of a child with syphilis may be accepted as evidence that the mother is likewise syphilitic even though her Wassermann test yields a negative reaction and even though she presents no clinical evidences of the disease. It is now quite well established that pregnancy results in an increase of immunity to syphilis which may afford much more protection to the mother against the disease than is the case in syphilis of men and nonchildbearing women, but the disease may be nevertheless present; and he felt that the mother of a syphilitic child should always receive appropriate treatment for the disease.

Dr. Kolmer entertained a very high opinion of the specificity of the Wassermann test for syphilis in this country, where frambesia is practically unknown. He is likewise impressed with the great value of cholesterolized antigens, but admits that they may sometimes yield a nonspecific reaction unless used in the proper dosage and in a proper manner. His own complement-fixation test does not yield nonspecific reactions and there is no fear of obtaining such in tests with the sera of nonsyphilitic pregnant women. In his experience a positive reaction in pregnancy with this test may be safely accepted as evidence of syphilis and this refers not only to the strongly positive reactions but to the weakly positive reactions as well. Indeed the danger is not from the standpoint of securing nonspecific positive reactions but rather from the question of falsely negative reactions. The serum test for syphilis is not yet capable of detecting all cases and in his opinion never will be, since the disease may be so latent that there is not enough antibody present in the blood to enable its detection in the test tube.

Dr. Kolmer did not find the sera of pregnant women to be more anticomplementary in his test than the sera of nonpregnant women, but placental cord blood is usually more anticomplementary.

DR. JOSEPH V. KLAUDER said that conditions which modify the transmission of syphilis include the duration of the disease in the parents, whether the mother alone is infected, or the father primarily infected, or both parents are infected. If the infection is recent in both parents and is untreated, the transmission of syphilis is certain. In these instances Kassowitz' law is invariably fulfilled, the

first conception resulting in a miscarriage, followed by a stillborn child, then by a child that lives only a short time; later children are born who soon present the clinical manifestations of syphilis. The longer the infection in the parents, the less disastrous the results with reference to the transmission of the disease. Then comes a time in which the disease is not transmitted to the progeny. It is thought that after eight, ten, or twelve years the disease is not transmitted. Of course treatment modifies the transmission of syphilis. Considering the aforementioned, the variable picture of a familial study is explained.

Dr. Klauder agreed with Dr. Belding and Dr. Kolmer about possible fallacy of the positive cord Wassermann. The obtaining of a positive Wassermann from the cord may be analogous to injecting four-plus Wassermann serum into the vein of a dog and immediately thereafter performing the Wassermann test on the blood of the same dog withdrawn from a different vein. In other words, the substances producing a positive Wassermann in the cord blood may be elaborated in the mother and not necessarily in the newborn child. Of course subsequent Wassermann tests performed with the blood of the newborn would eliminate this possible fallacy.

The transmission of syphilis is a matter of vital importance to the obstetrician and Dr. Klauder even said that it is incumbent for the obstetrician to become a syphilologist, in order to become familiar with the clinical manifestations of syphilis and the ever-changing therapy of the disease. The obstetric clinic and syphilitic clinic should closely cooperate. Perhaps the ideal plan would be to have part of both clinics merge into one, thereby facilitating cooperation, conferences, consultations, therapy and follow-up of the patient.

In recently infected women, conception should be delayed until the Wassermann becomes negative as a result of treatment. To obtain a negative Wassermann in these cases is not difficult. However, in patients not recently infected, to obtain a negative Wassermann is sometimes very difficult.

Bismuth was in many cases a better suited drug for the obstetrician to employ than the arsenicals. In many ways it is safer and at the same time very effective. After its use one does not experience the severe untoward reactions as after the arsenicals. The fact that it is given intramuscularly has much in its favor. Its therapeutic value is greater than mercury, approaching that of the arsenicals, without many of the latters' disadvantages.

DR. KNIPE said he would like to know what should be told to a man, known to be or have been syphilitic, about to be married.

DR. KOLMER said that it is very difficult to pass upon the question of the curability of syphilis but his present criteria in relation to candidates for marriage are as follows: (a) Complete absence of all clinical manifestations; (b) a series of negative Wassermann reactions over a period of two years with a test combining the maximum degree of sensitiveness with specificity; (c) at least one examination of the cerebrospinal fluid with a normal number of cells, no increase of protein, a negative colloidal gold reaction, and a negative Wassermann reaction.

When the Wassermann reaction is employed as one of the criteria of cure it is particularly imperative that the method shall be one combining the maximum degree of sensitiveness with specificity. Great harm is being done at present by guiding the treatment of syphilis by a Wassermann test lacking in sensitiveness because this may mean the administration of insufficient treatment.

Dr. Kolmer believed it particularly important to apply rigid criteria in the case of a syphilitic woman approaching marriage because she is more likely to transmit the disease to the offspring than is a syphilitic male. In every case there should be an absolute minimum of treatment regardless of the results of serum tests.

DR. BELDING said that it should be clearly understood that these tests were made with the old style cholesterolized antigen before Dr. Kolmer's present technic had been perfected. Technical errors may give rise to false negative as well as to false positive reactions in the pregnant woman. He had had little experience with the Kahn test in the pregnant woman. Dr. W. A. Hinton, of the Massachusetts Department of Public Health, has found the Kahn test rather unsatisfactory in pregnancy. He (Dr. B.) found the Kahn test highly satisfactory as a check on routine Wassermann tests. In patients under treatment, the Kahn reaction apparently remains positive longer than the Wassermann reaction. Dr. Belding was favorably impressed with bismuth, particularly in the treatment of arsphenamine-fast patients. It represents an additional drug for the syphilitologist, which is especially advantageous when frequent change of remedy is desirable. There is no reason why it should not be used during pregnancy if due precautions are taken in regard to dosage.

In interpreting the statistics presented this evening it should be remembered that both the treated and untreated groups are composed of serum-positive syphilitic women, only part of whom show evidence of clinical syphilis; that old and inactive syphilis in the mother does not have as injurious an effect on the child as recent active syphilis; and that the treated women received insufficient treatment according to present-day standards; therefore the effect of treatment is less striking. The clinical composition and previous history indicate that the treated group is more seriously afflicted with syphilis than the untreated group, and that it is more nearly comparable to that section of the untreated group which include women with a history of clinical syphilis. A comparison of the two groups shows that the treated women have 1.6 times as many living nonsyphilitic children as the untreated women with clinical syphilis and that the difference lies chiefly in the fetal death rate.

The determination of the presence of congenital syphilis in children, as brought out by Dr. Kolmer, is especially difficult. Dr. Belding classed as nonsyphilitic all children under four years of age in whom careful physical and serologic examination has not revealed the presence of syphilis. Unquestionably children with latent syphilitic infection have been overlooked.

NEW ORLEANS GYNECOLOGICAL AND OBSTETRICAL
SOCIETY

MEETING OF MARCH 10, 1926

DR. MAURICE J. GELPI reported a case of **Hydrosalpinx with B. Coli Infection.**

This case was presented to elicit discussion as to the possible origin of the infection and the wisdom of the conservatism adopted in handling it. This patient was believed to have had pyelitis, of colon bacillus origin, almost from babyhood, and she continued delicate, with recurring attacks of the supposed trouble, until she was old enough to be given kidney lavage, when she improved somewhat, although even then she remained so delicate that tuberculosis was always considered a definite possibility with her. The pyelitis, however, did clear up. Almost as soon as she was married she began to have pelvic trouble. Her first period after marriage was regular, following which time she did not menstruate for six weeks. Then intermittent bleeding began, the pelvic pain getting more and more annoying and finally localizing to the right side. I found an apparently cystic mass on that side, which I considered strongly suggestive of an ectopic, in view of the

history. Under rest and observation the mass increased in size, and I therefore advised operation under local anesthesia, to which she agreed. Laparotomy showed a very ugly appendix, and instead of the one cystic mass, which I had made out on examination, bilateral masses were found, adherent in every direction, and extending down to the rectum. They were definitely hydrosalpinges. Aspirating as a routine, although I did not expect a positive culture, I found colon bacillus. The question was now what to do. She was very young, anxious for children, and in view of the nonspecific character of the infection I felt justified in resecting each tube and leaving the stump *in situ*, so that I could tell her truthfully that anatomically and physiologically she could bear children. I am not, of course, very hopeful that this will come to pass.

DISCUSSION

DR. C. JEFF MILLER.—The origin of infection in these cases is very difficult to determine, and the childhood history is sometimes of value. It is a possibility in this instance, as in others, that the infection, when the patient was a young girl, may have been of the specific type, for we know that the gonococcal strain may die out and pave the way for a mixed infection later. In this case the long-standing pyelitis seems to offer a definite entrance. I have found also that some cases giving a history of prolonged constipation will show a pure colon bacillus infection. Ascending infections are not so easily explained; the internal os, is an effective barrier against almost every organism except the gonococcus. The cavity of the uterus is usually sterile, even in the face of marked adnexal or cervical disease, and we now know that our former term "chronic endometritis" is a misnomer. Another possible avenue in this case is an old specific infection which spread upward during menstruation. Kidd, in a recent review of the subject from his large London clinic, states that if infection occurs eight or nine days before a period, extension upward is possible during menstruation, particularly if the patient remains up and active. On the other hand, such an infection may lie dormant for years and be carried up later during the trauma incident to delivery. Certainly the majority of these cases are originally specific in origin, no matter with what strain they end.

As to the matter of conservatism; in this case I think it was wise to attempt it, though I have never considered the thickness of the tubal wall as a criterion in my decision. Part of our trouble in the past is that we have not paid enough attention to the isthmic portion of the tube; pathology in that region should be a definite contraindication to conservatism.

DR. P. B. SALATICH.—The etiology of these cases is almost impossible to determine in many instances, and innumerable theories, some of them rather fantastic, have been advanced to explain it. I have been rather fortunate in conservative pelvic surgery, in one case particularly, that of a woman whose first pregnancy terminated in abortion and her second in an ectopic, without operation. She was very anxious for children, and when she came to me, I advised a long period of rest, followed by laparotomy. At operation I found the right side completely destroyed by the former ectopic, while the left tube was the site of a hydrosalpinx, containing possibly 7 oz. of fluid. The ovary was three times its normal size and cystic. I removed the left adnexa and resected the tube and ovary on the right, without much hope of a successful result, but since then that patient has had two normal deliveries.

DR. W. E. LEVY.—I am wondering whether conservative surgery in these cases opens up an avenue for subsequent interstitial pregnancy. In looking up the literature on the subject, because of a case of this sort which I had recently, I noticed that Dr. Matas in the *Transactions of the Southern Surgical Association*

for 1905, reported a case of interstitial pregnancy in the stump of a resected tube. If the fimbriated end is occluded, the isthmic end may be partially occluded also, and the ovum might be arrested there, with a resulting interstitial pregnancy.

DR. GELPI (closing).—As Dr. Miller says, the possibility of specific infection is inherent in every sort of pelvic disease and should be carefully considered. I felt in this case that it could be ignored, not only because of my knowledge of her previous history but also because of the character of the hydrosalpinx. A tube specifically infected is always thickened and that thickening remains for years, even after the primary infection disappears. Even where specific infection is only suspected, I think conservatism is unwise, for the section left harbors the infection, and you will hear from it later. In the thin-walled, nonspecific type, however, the pathology comes from pressure, and so the wall itself is not involved in the process. I agree with Dr. Levy that interstitial pregnancy at a later date is a possibility, but in a young woman who ardently desires children the risk is worth taking.

DR. E. L. KING, read a paper entitled **Intrauterine Fetal Death Due to Anomalies of the Cord.** (See page 812.)

DISCUSSION

DR. E. S. LEWIS.—A very interesting article on the causes of intrauterine fetal death will be found in the February issue of the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY. One type of prenatal fetal death before maturity is often due to a more extensive fatty degeneration of the placenta than normally occurs even at term, with consequent impairment of function. The induction of premature labor prior to the time at which habitual death occurs in women with a history of repeated stillbirths prior to term will often result in the birth of a living child. I recall one case of stillbirth due to compression of the cord between the head and the pelvis, so high as not to be suspected. Immediately after the birth of the head a long loop of cord prolapsed beside it, and a definite area of compression was visible. The heart sounds were normal when the head engaged but ceased during the progress of labor.

DR. P. B. SALATICHI.—We pay too little attention to anomalies of the cord. If the baby is alive and well we are inclined to forego routine examination of the cord, whereas if it were examined routinely at every delivery we might get some valuable information, and we would, I am sure, find many more true knots than are usually supposed to occur.

DR. HILLIARD E. MILLER.—I have seen lately a fair number of short cords and asphyxiated babies, and in three instances particularly respiration has been established with difficulty. I have been using in these cases alpha-lobelin by hypodermic, which acts promptly upon the respiratory centers of the brain.

DR. KING (closing).—I believe an occasional case of intrauterine fetal death is due, as Dr. Lewis says, to the so-called concealed prolapse of the cord. I recollect one instance several years ago, in a face presentation. When I made my examination the cord was not accessible, and the baby died long before the cervix was sufficiently dilated to permit of any sort of delivery. The patient was a primipara, with a face presentation, which was reduced to an occipital. A stillborn baby was delivered by forceps. There was a definite area of compression in the cord, and I could discover no other reason for the stillbirth. Possibly in other instances of unexplained fetal death within the uterus the cord may have prolapsed at the side of the head.

DR. E. L. KING also exhibited a specimen of papyraceous fetus, one of twins. The other twin, a full-term, normal baby, was born first. Its cord was of normal size and thickness, and the sac was unusually large. The shriveled fetus had a small, shriveled cord, and a very small sac. The placentae were separate, one being normal, the other very much degenerated. Apparently they were double ovum twins, each with a separate placenta and amnion.

DR. HILLIARD E. MILLER read a paper entitled **Curettage of the Uterus, Its Indications and Advantages.** (See page 860.)

DISCUSSION

DR. E. L. KING.—I wish to second Dr. Miller's warning against the use of the curette in incomplete abortions. In many articles, particularly in the French journals, this procedure is advocated, and I gather that some men curette all abortions as a routine. In our large service at Charity Hospital (Dr. C. Jeff Miller), where we get all the incomplete abortions on the white side, we have entirely discarded the curette. I don't think we use it twice a year, and we handle several hundred cases yearly. When we do use it, it is because of hyperplasia following an old, improperly handled abortion. Our routine procedure, when interference is indicated, is to clean out the uterus very gently with the finger or sponge forceps, occasionally without anesthesia, but usually under general. There are several obvious objections to the use of the curette under these circumstances. One is that the fundus of the uterus is very soft and correspondingly easy to perforate. Another is that we do not know which of these cases are criminal abortions, and potentially infected already, even if fever is not present, so that curettage may spread the local infection throughout the system. The simple cleaning out I have described is as safe as any procedure can be under the circumstances. One point not usually stressed, but which I noticed particularly in a French journal some years ago, is the importance of checking up the position of the uterus before operating. In the instance cited the patient had a retro-displaced uterus. No examination was made at the time of operation, the dilator was introduced with the curve forward, and perforation just above the internal os promptly resulted. The surgeon recognized the accident and repaired it at once, and was also brave enough to put his mistake on record.

DR. E. S. LEWIS.—I suppose I shall be classed as archaic, but I am in favor of the curette in selected instances. I can recall many times when its use was decidedly advantageous in the treatment of early abortions with continued hemorrhage due to retention of the secundines, and I cannot say that I have any regrets on that score. I believe that interference is wise as soon as it is definitely ascertained that abortion has occurred, since continued retention means continued hemorrhage and also danger of sepsis. After the placenta is fully formed, the finger makes the best curette, and can be inserted easily if interference is practiced at once. If it is deferred, dilatation of the cervix is usually necessary, as contraction occurs very rapidly. The uterus is soft and may be easily perforated in careless hands, so extreme gentleness is necessary. I have also used the curette for menorrhagia and metrorrhagia hundreds of times without accident, though of course I am referring to my early days, when this instrument was used very much more widely than it is at present. For years before I gave up obstetrics I had ceased to use the curette in puerperal infections, for in the light of our present knowledge this procedure is a dangerous and unwise one, and yet I can recall several instances in the past in which it did good. I remember one patient who had a premature delivery at six months, followed by a sapremic infec-

tion with a highly offensive discharge, and very high temperature. I curetted her thoroughly, gave her a carbolic intrauterine irrigation, and packed the uterus thoroughly with iodoform gauze. When I returned the next day I found her entirely free from fever, and her convalescence thereafter was without incident. The procedure is not a safe one, however, and I would no longer advocate it. In my hands, curettage for sterility has frequently resulted in pregnancy. I also agree with Dr. Miller that in many instances it will obviate the necessity for a more serious and more radical operative procedure.

DR. MILLER (closing).—The whole point of this paper was to analyze results in the cases in which we advocate curettage where others condemn it. I made no statistical study, but a casual review of our records has thoroughly satisfied me that we are justified in our stand, and that the number of radical operations we perform is decidedly less than if we were bound by the classical indications ordinarily advanced for the use of the curette.

MEETING OF APRIL 29, 1926

DR. JOHN F. DICKS read a paper on **Intracranial Hemorrhage in the Newborn.** (See page 871.)

DISCUSSION

DR. E. L. KING.—In public hospitals, where obstetric cases are so often brought in as emergencies after neglect or bad management, we may be responsible for some cases of intracranial hemorrhage, because we frequently have to apply forceps against our better judgment, it being too late for cesarean section. Intracranial hemorrhage is so frequently found in difficult labors that spinal puncture is always indicated at once if these babies show any signs of respiratory embarrassment or irregular respiration. The cases which give me the most anxiety are those in which there is a peculiar grunting, somewhat like the expiratory grunt of pneumonia. My experience is that such babies usually die, although it is our practice to do spinal puncture on them at once. We do not always enter the canal on the first trial, I admit, but repeated attempts usually end in success, and certainly when the bloody fluid is released the change in the child's condition is most striking. In one such case we worked over the baby for more than three hours, but almost as soon as the bloody fluid was withdrawn under pressure there was no further trouble. The child a year later was apparently normal in every respect, although the ultimate outcome is, of course, still dubious. Autopsy should be done whenever possible, but the skull is usually opened the wrong way. I do not believe that a newborn infant's skull should ever be opened by sawing around the top of the head. Intracranial hemorrhage will never be detected by that method. The technic Ehrenfest describes is much the best. He advocates incising on either side of the midline, just external to the superior longitudinal sinus; anteriorly the coronal suture is cut through, posteriorly the lambdoidal suture is cut, so that the parietal bones are finally laid open with the temporo-sphenoidal suture as a hinge. Then the tentorium can be studied after the removal of the cerebral hemispheres and the interior of the skull examined.

DR. LUCIEN A. LEDOUX.—In our service we have adopted the plan of routine autopsies, and seven out of the last eight showed that death was due to intracranial hemorrhage, varying from the small petechial type to a clot the size of a hen's egg. Of these cases some could be attributed to operative delivery and some to the use of pituitrin. The obstetrician is not always to blame, for uncontrolled, precipitate labors in my opinion are responsible for a large number of

these cases. Pituitrin, however, is responsible for many more, for its use invariably causes an excessive overlapping of the cranial bones which is bound to result in injury. Spinal puncture has a diagnostic as well as a therapeutic value, and I would advocate doing it and repeating it as indicated, regardless of the type of injury.

DR. HILLIARD E. MILLER.—I take exception to the generalization that operative delivery always predisposes to intracranial hemorrhage. I believe that if more cases were interfered with earlier we should have fewer such mishaps. When there is a long, tedious labor, and particularly a prolonged second stage, you almost invariably have a malpresentation of the head or a postmature baby. Early recognition of these cases with the proper operative delivery will achieve very much better results than waiting for the head to mold. In occipitoposterior positions, where engagement does not occur after full dilatation, version and breech extraction lessen the chance of intracranial hemorrhage. The termination of a prolonged second stage by the careful application of forceps, granting, of course, that the indications warrant this procedure, will eliminate a fair percentage of these head injuries. I, personally, have had no case of intracranial hemorrhage in the last five years, and I attribute it to the fact that I am a consistent advocate of early forceps application.

DR. J. S. HEBERT.—I am in accord with Dr. Miller's remarks, for I believe that he has given the correct explanation of a large number of these accidents. Furthermore, I wish to add that when prenatal care includes, as it should, a complete physical examination and accurate pelvic measurements, many more of these unfortunate cases will be eliminated. In the management of a case with borderline pelvic diameters, for instance, the recognition of such a condition prior to the onset of labor will mean that the test of labor is conducted with proper precautions, and that operative delivery, by cesarean section if necessary, can be instituted with safety when it is evident that vaginal delivery is impossible. Careful watching of the fetal heart will also permit operative interference in time to save the child when carelessness in this regard may mean either the death of the fetus or serious brain damage.

DR. CHARLES J. BLOOM (by invitation).—I saw the first child reported by Dr. Dicks about thirty-six hours after delivery, after several convulsions, when there was a marked disinclination to nurse, protrusion of the tongue, and other definite symptoms of intracranial hemorrhage. Three spinal punctures were done, bloody fluid being recovered in successively smaller amounts, and whole blood was given subcutaneously after each puncture. The child is now about two years old, and apparently perfectly normal. She is in full possession of her mental faculties and shows none of the earmarks of spastic paralysis so often referable to this condition. Another case similar to this one was referred, after a prolonged labor. There was no external manifestation of injury, but thirty-six hours after birth the child became very pale, refused to nurse, and gave evidence of tonic convulsions. One spinal puncture, with the fluid somewhat under pressure, seemed to relieve the symptoms entirely, and twenty-four hours later the child was nursing with avidity. The second case which Dr. Dicks has reported is rather interesting. Twenty-four hours after birth fever developed, which, in view of the lack of other symptoms, we considered a possible inanition fever; this, as you know, is possible, though not probable, in a very young infant within the first thirty-six hours. The classical symptoms of intracranial hemorrhage developed shortly afterwards, however, and the fever on the third day reached a maximum of nearly 107°. There were marked opisthotonus, clonic and tonic convulsions, and irregular attacks of cyanosis. The convulsions were without periodicity and

of varying duration. I have never seen a more marked case of opisthotonos, and death seemed imminent. Two spinal punctures were done, followed by the routine subcutaneous injections of whole blood, and recovery was most gratifying. The child is now three months old and apparently normal in every respect.

From the point of view of the pediatrician, intracranial hemorrhage in the newborn is usually considered to be due to three chief factors; trauma, asphyxiation, and the so-called hemorrhagic disease of the newborn. To my mind the latter condition plays but a small part in the etiology of this condition, and I consider trauma to be the most important factor, whether it occurs as the result of precipitate labor, faulty instrumentation, or the use of pituitrin. Asphyxiation is practically always the result of the different obstetric maneuvers and therefore is really an indirect result of trauma. Regardless of the cause, it should be emphasized that it is the responsibility of all, pediatricians, obstetricians and general practitioners alike, to watch for this condition and to recognize it at birth. There are usually too many symptoms to excuse a failure to diagnose the average case. Many authorities go so far as to say that any child delivered after pituitrin or obstetric maneuvers of any kind, or by a precipitate labor, should be given the benefit of the doubt; that is, it should be subjected to the most careful observation, and spinal puncture should be done on the appearance of the slightest symptom. Dr. John Foote of Washington advocates the giving of 20 c.c. of whole blood subeutaneously after any questionable labor as a prophylactic measure. When active symptoms are present, spinal puncture should be done as soon as possible, and should be repeated every six to eight hours until the fluid assumes a normal color, whole blood being given after each puncture. In every case we have treated in the last five years by this routine the results have been most gratifying except in one instance; in this case the child has a slight shortening of the left leg, so slight, however, as to be hardly noticeable.

DR. WALTER E. LEVY read a paper entitled **The Value of Glucose and Insulin to the Obstetrician and Gynecologist.** (See page 866.)

DISCUSSION

DR. E. L. KING.—I have used this method particularly in the vomiting of pregnancy, and I am inclined to believe that Thalhimer is right in his contention, although I am aware that Titus considers that the addition of insulin to the glucose introduces a decided element of danger. In the vomiting of pregnancy, in the pernicious type, if vigorous use of this method does not give results within twenty-four to forty-eight hours, the case will generally demand therapeutic abortion. Possibly in the individual case the time limit might be somewhat extended, but as a general rule it would seem that if the method is to be effective, it will be effective at once. In eclampsia and pre-eclamptic toxemia I am not so sure that insulin is as effective.

DR. C. JEFF MILLER read a paper entitled **The Preventive Aspects of Postpartum Care.** (See page 856.)

DISCUSSION

DR. W. D. PHILLIPS.—Prenatal care in recent years has received a great deal of attention, but our watchfulness too often ends with the delivery. The condition which has given me most trouble is retrodisplacement of the uterus. A possible cause, which I have not seen mentioned very often in the literature, is too great haste and too much force in the expulsion of the placenta. Free

movement of the patient immediately after delivery is an important preventive measure. The knee-chest position is also very useful. Careful examination of the patients after delivery and also before they leave the hospital should be routine.

The final examination is particularly important when repair has been necessary, for if the sutures have not held properly and the lifting portion of the levator ani muscle has been injured, the foundation of a downward displacement of the uterus is thus laid. In connection with immediate repair of the perineum I think possibly our unsuccessful results are often due to infection of the wound from fecal material passing over it at the time of delivery.

DR. HILLIARD E. MILLER.—I make it a point to instruct each of my patients that I expect a phone call from her on the eighteenth day, for I have found that in a surprising number of cases the red lochia persist up to and beyond this period, and under the circumstances, as you know, involution is retarded. If the red discharge is persisting at this time, I give ergotine, 2 gr. twice a day for ten days, instructing the patient to continue it the full time for its tonic effect, no matter how soon the flow may cease. I order as a routine hot daily douches for ten days after the patients leave the hospital, and then two or three times a week until the final postpartum examination. If in spite of these measures the flow persists, I paint the vault of the vagina with tincture of iodine, swab out the excess with alcohol, and use ichthylol and glycerin tampons on alternate days until relief is secured. If we are careful about early subinvolution we shall see fewer cases of retroversion after parturition.

DR. WALTER E. LEVY.—I do not approve of a routine enema before delivery on the nurse's responsibility alone, for the reason that in more than one instance I have seen delivery precipitated when the enema was being expelled. It is routine on our service at Touro for the nurse to insert the rectal tube after the enema is given, so that the entire contents are expelled and the chance of contamination during labor is minimized. We also have a standing order that if a patient has not voided within eight hours after delivery, the nurse need not wait for an order to use the catheter, if the simpler measures to induce voiding have failed. A full bladder is responsible, in my opinion, for many cases of postpartum hemorrhage, for as the bladder rises, it drags the uterus up with it. Furthermore, a full bladder can force a uterus into retroversion, and retention of the lochia will result.

DR. MILLER (closing).—I have seen patients frequently complain of abdominal cramps after cauterization when the treatment was extended up to the internal os, and for that reason, when I feel that cauterization is necessary to the upper limit of the cervix, I advise that it be done under anesthesia. The best effect of cauterization for the ordinary erosions is secured within two to four months after delivery, and even when a fair degree of laceration is present this procedure is remarkably effective. The infection, of course, rather than the laceration is the important factor, and too much stress cannot be laid upon clearing up these conditions. To me the simplest method of treating a retroverted uterus following delivery is the insertion of a Smith or Hodge pessary, which takes the weight off the ligaments; it must be realized that if the uterus sinks below a certain level in the pelvis, disturbances of circulation are bound to result. The pessary has its widest field of application here, and provided the pelvic floor is in good condition, it will avert a very fair percentage of subsequent suspension operations. I cannot agree with the men who advise against the repair of lacerations in the childbearing period. I have seen many of these patients, when that period was past, with large, hyperplastic uteri, cystocele, rectocele and intractable bladder symptoms.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Selected Abstracts

Uterine Malpositions

Von Jaschke: The Import and Value of General Symptoms in Retroversion and Retroflexion of the Uterus. Zentralblatt für Gynäkologie, 1925, xlix, 189.

The writer believes that general symptoms are rarely a result of alteration in the position of the uterus, either directly or reflexly; nor are they to be described as a psychoneurosis. In nulliparas the underlying cause of symptoms is usually a general enteroptosis. Even with definite enteroptosis in normal women localized complications with resultant alteration of structure and function is an important factor. There is no general rule for operability.

LITTLE.

Meyer-Ruegg, H.: On Retroflexion of the Uterus. Schweizerische medizinische Wochenschrift, 1923, liii, 34.

Retroflexion is assigned by physicians as one of the common causes for numerous disturbances in the female organism. It has occupied a place of importance as a causative factor because of the mental attitude towards its significance as a disturbing element. The fairest way is to consider retroflexion merely as one of the various positions of the uterus, anomalous or otherwise, and treat it intrinsically as such. Of itself, the discovery of retroflexion in examination does not mean it must be corrected except in certain instances, for example: cases of sterility where all other factors have been eliminated; where there is possibility of incarceration in pregnancy beyond the fourth month; if the uterus has prolapsed to the pelvic floor or is at the genital hiatus, or when all other measures have failed, and operative correction may have a beneficial psychic effect on the patient.

A. C. WILLIAMSON.

Donald, Archibald: Treatment of Mobile Backward Displacement of the Uterus.

British Medical Journal, 1924, ii, 1087.

"A retroverted, a retroflexed, anteverted or anteflexed, or laterally displaced womb does not cause pain, disorder, or disability." That retroversion sometimes may be accompanied by lumbar ache, aching hips, aching in the groins, thighs and so forth, is admitted, but no mention is made of menorrhagia, leucorrhea, or dysmenorrhea.

In regard to the view that passive congestion is the cause of various symptoms the writer makes the following objections: (1) Bluish discoloration of the uterus could be expected, a condition which is never found. (2) Arrangement of circulation in broad ligament would make congestion difficult. (3) No evidence of congestion is seen in severe prolapse, where it might be expected, if anywhere. (4) No dilatation of veins is seen on microscopic examination. (5) If hemorrhage is due to venous obstruction, oozing would be of the venous type, but the menorrhagia is the same in retroverted as in the anteverted uterus. (6) Leucorrhea must mean

increased activity of glands, but does congestion cause an increased activity of gland?

Treatment is required only by coexisting complications. Ninety per cent who consult a doctor do so because of menorrhagia, metrorrhagia, leucorrhea or dysmenorrhea. These disorders are regarded as due to endometritis or chronic metritis and are treated by curettage. By curettage 88 per cent are improved.

Treatment with pessaries probably has only suggestive effect, but in cases of prolapse it relieves the bearing down sensation.

Mere suspension yields poor results in the presence of adhesions or weak abdominal walls, and does not relieve dysmenorrhea, metrorrhagia, leucorrhea, etc. The only type of suspensory operation the writer uses is ventrosuspension or suture of the anterior uterine wall just above the external os to the anterior abdominal wall without removing the peritoneum.

ADAIR AND RICE.

Michailov: The Importance of Constitutional Conditions in the Etiology of Genital Prolapse in Woman. Russian Clinie, 1924, i, 427.

The two main factors in the causation of prolapse are (1) multiple labors and heavy work, and (2) a definite predisposition of tissues to lose easily their natural turgescence. In those women in whom this second factor evidently represents the main causative factor of an existing prolapse the author was able to ascertain as characteristic external features: a narrow chest, a sharp epigastric angle, and a long distance between the lower end of the sternum and the navel. He applies to this type of women the term "gothic style." It was distinct in 30 per cent of the cases studied. The writer stresses the importance of this peculiar habitus for the purpose of preventing the development of a prolapse in women of the gothic style.

AUTHOR'S ABSTRACT.

Novak: The Vaginal Pessary: Its Indications and Limitations. Journal American Medical Association, 1923, lxxx, 1294.

The indications for the use of the vaginal pessary are taken up under separate headings and each group elucidated by the quotation of statistics or case reports. The various types of pessary represented in illustrations are ideally selected to fit the individual case. In discussing the contraindications, precautions, and dangers of pessaries, Novak brings out important diagnostic and therapeutic suggestions.

W. KERWIN.

Hofmeier: The Operative Treatment of Retroposition of the Uterus. Zeitschrift für Geburtshilfe und Gynäkologie, 1923, lxxxvi, 509.

The author cites results obtained in approximately 800 ventrofixation operations. One hundred and sixty-three operations were for movable retroversion, 393 for fixed retroposition with or without adnexal masses, and 244 for descensus and prolapse in conjunction with other plastic operations. There were two deaths during the hospital stay in this series, both were in severely complicated cases. In the one, a large ovarian tumor was associated with an extensive prolapse; in the other, extremely dense adhesions were present in the culdesac, probably the result of a periproctitis. The first patient died of embolism on the sixth day; the second, of peritonitis on the fourth.

Patients with movable retroversions were operated upon only when they gave symptoms definitely ascribable to the retroversion, and could not be cured by simpler measures. In retroversions complicated by inflammatory processes, the symptoms are usually attributable chiefly to the latter, and operation is indicated unless simpler measures give very prompt relief. Schauta's interposition is such a satisfactory

operation in the treatment of prolapse that ventrofixation is employed only in younger women in whom the reproductive activity must be preserved.

The technic is essentially that of Olshausen. In the simpler cases the Pfannenstiel incision is used; in more complicated cases, the midline longitudinal adhesions are separated, and severely diseased adnexa removed. The ligaments are fixed into the fascia of the abdominal wall from 1 to 5 cm. from their uterine attachment. The lower portion of the peritoneal wound is closed with two catgut sutures which are taken through the anterior surface of the uterus, not through its fundus. Careful attention to this latter point and to the mere approximation of peritoneal surfaces account for the fact that, in a considerable series of later pregnancies and labors, serious difficulty was encountered in only one case.

One hundred and thirty patients operated upon from two to ten years previously were reexamined, and perfect orthopedic results were found in 85.3 per cent. Of 134 other patients, who answered the questionnaire, the result was good in 95 per cent. The functional result, which is not always the same as the anatomic, was perfect in 80.1 per cent of patients, both in regard to general health, and to capacity for work.

Of these 264 women, 80 became pregnant; 51 women, once; 20, twice; 7, three times, and 2, four times. In addition, there were observed in the clinic 25 deliveries of patients operated upon elsewhere, a total of 145 pregnancies. Of these, 110 delivered spontaneously, 8 by forceps, 9 had versions for transverse presentations. There were two premature labors, one extrauterine pregnancy, 14 abortions, and one cesarean section. In this case section was necessary because of entire lack of development of the lower uterine segment with marked upward displacement of the cervix, due to the dense adhesions at the fixation site. In spite of an attempt at careful peritonization, the same condition recurred in the next pregnancy, necessitating a repetition of the cesarean.

MARGARET SCHULZE.

Von Jaschke: Genital Prolapse in the Light of Constitutional Pathology. *Archiv für Gynaekologie*, 1923, cxx, 56.

In a series of 490 cases of genital prolapse, 447 showed definite signs of constitutional anomalies. The author believes, therefore, that the general conception of prolapse must be changed. The dispute as to the rôle of connective tissue and the musculature, and the comparative importance of connective tissue ligaments as against the muscle supporting apparatus loses all its value. The author still believes that in a normal woman, injury of the muscle-supporting apparatus is more important in the development of prolapse than any injury to the connective tissue suspensory apparatus. Recent experiences, however, teach that it is usually due to an inferiority of the whole organism and is often the most striking stigma of a constitutional anomaly. The most common constitutional anomalies are asthenia, infantilism, or a mixture of the two.

RALPH A. REIS.

Zimmerman: Evaluation of the Operations for Correction of the Position of the Uterus. *Zeitschrift für Geburtshilfe und Gynäkologie*, 1923, lxxxvi, 536.

The author reports results obtained in the treatment of 1035 cases of retroversion. There were 278 fixed retropositions and 757 mobile ones. Of the latter group, 582 (70 per cent) were treated conservatively, and 175 (30 per cent) operatively. Of the 278 fixed retropositions, 62 (28 per cent) were treated conservatively and 216 (72 per cent) were operated.

There were no deaths in the 386 operations. The types of operation employed were the Alexander-Adams in cases of movable retroversion without complications (118 cases), the Olshausen (132 cases), or the Baldy-Webster (59 cases). Where complications necessitated laparotomy the Leopold-Czerny, or ventrofixation (65 cases),

in women no longer capable of becoming pregnant; and in 12 cases intraperitoneal shortening of the round ligaments by plication. The results were satisfactory in all types of operation except the Baldy-Webster where, though the immediate results were very good, later examination showed 25 to 30 per cent of recurrences. This operation has, therefore, been discarded. Results with the other types of operation, though good, are still capable of improvement, but improvement should be sought in more careful determination of indications, and attention to details of technic rather than in a multiplication of operative procedures.

MARGARET SCHULZE.

Don, A., and Don, V.: Pelvic Hernia (Prolapse): The Proper Use of Pessaries and a New Method of Closing the Opening. The Clinical Journal (London), June 6, 1923, page 265.

The levators are the important components which must be carefully secured and used as buttresses just as are the recti in abdominal hernia, if an effective closure is to result. Pessaries at best are makeshift and to be useful should take their supports from the sides of the genital hiatus and not from the rectum or pubes; hence, the Zwanke type is the most scientific. Where repair has been decided upon the patient should be given sufficient time and rest after delivery for the muscles to have regained their elasticity and for the parts to have come as near back to normal as they will. During operation hemostasis is carefully carried out. The levators are well exposed. Beginning posteriorly a continuous suture of fine catgut is introduced, coming down and picking up fascia and finally muscle. Figure eight silk-worm suture is next introduced and last of all the vaginal flap is trimmed and sewed down.

A. C. WILLIAMSON.

Robinson, Wm.: On Hernia through the Outlet of the Pelvic Diaphragm in Women (Prolapse of the Uterus) and Its Radical Cure. The Clinical Journal (London), Jan. 1, 1926, p. 1.

In discussing the condition the function of the muscle fibers connecting the two adjacent sides of the puborectalis is especially stressed. Prolapse of the bladder, vagina, uterus and occasionally of the rectum through the outlet of the pelvic diaphragm results from: 1. Damage during labor to the puborectalis by the overstretching of the ring and the rupture of its connecting fibers. If the child's head is forcibly pulled through by forceps before it has passed through the cervix, the latter is also dragged down and the uterosacral ligaments are overstretched, apart from the increased risk of damage to the ring and its connecting fibers by this wrong procedure. 2. When the ring in the pelvic diaphragm is thus overstretched the intra-abdominal and intrapelvic pressure which is more or less constantly exerted, and which is increased by hard work, causes overstretching also of the uterosacral and transverse cervical ligaments. An almost constantly loaded rectum, by pushing the cervix forward and inducing prolonged straining at stool, also helps materially to cause a gliding hernia of the pelvic organs through the ring in the diaphragm.

For cystocele, an anterior colporrhaphy is advised. The bladder pouch is well freed from vagina and uterus and pushed upward and the edges of the vaginal wound and the underlying muscle tissue are stitched together from side to side. If the cervix is badly lacerated or much enlarged it is amputated, care being taken that the cervical and uterine cavity be left three inches long to guard against miscarriage.

In women past the menopause the uterus occasionally may be interposed, and in old women where the uterus is atrophied it may be removed and the broad ligament stitched together. In old unmarried women who are frail, Le Fort's operation is employed.

For relaxed pelvic outlet with or without rectocele the careful dissection of muscle is carried out, and just at the close a purse string suture is passed through the skin

at the upper end of the incision on one side down through the submucous flap and out of the skin at the other edge of the wound, so that when the suture is pulled up tightly the valvular action of the outlet of the vagina is restored. The author claims successful results in more than two hundred cases.

A. C. WILLIAMSON.

Miles, Lee Monroe: Pelvic Hernia. *Surgery, Gynecology and Obstetrics*, 1926, xlvi, 482.

A new classification embracing all hernias occurring through the pelvic floor is offered, following the general usage of terminology and classifying them according to their course thus: a pelvic hernia may be perineal, pudendal, or vaginal, and a vaginal pelvic hernia may be anterior or posterior. Prolapse of the uterus accompanied by a general enlargement of the culdesac and protrusion of abdominal contents into the vaginal vault should be called either elytrocele or vaginal enterocele, and not a hernia.

The literature on the subject is reviewed and nine cases which appeared to be definitely of this order are described together with two additional cases seen by the author.

The cause of these hernias is with one exception found to be traumatic, following pregnancy or childbearing.

The treatment is operative, and the best operation is a perineal operation, by which the sac is excised and the perineum is repaired, combined with an abdominal operation for obliterating the culdesac.

WM. C. HENSKE.

Duehrssen, A.: A Contribution to the Priority and Technic of a Well-Known Gynecologic Vaginal Operation. *Archiv fuer Gynaekologie*, 1925, exxiii, 452.

Duehrssen quotes at length the article by Hastrup in which the latter claims that neither Schauta nor Wertheim nor Watkins should be given credit for the "Interposition" operation. Both Schauta and Wertheim first described their operation in 1899, whereas Duehrssen had performed this operation at least five years earlier and had described technic and results in detail in 1894. He had even coined the term "interposition" for this operation and it can be found in the original article. Since procedure and technic of Schauta, Wertheim, and Watkins differ only in details from this original operation, it is a mistake to associate the names of any or all of them with this operation. It should be called the "Duehrssen Interposition Operation."

The author also proves his priority in the so-called paravaginal incision of Schuchardt and in the method of sterilization which is usually credited to Deutzmann and Sellheim.

RALPH A. REIS.

Johnson, Frederick W.: End-Result in the Interposition Operation for the Cure of Prolapsus Uteri and Cystocele. *Surgery, Gynecology and Obstetrics*, 1926, xlvi, 527.

The interposition operation, described by the late Thomas J. Watkins of Chicago, is the foundation on which the author has built, but his operation differs from any other in that the whole anterior surface of the uterus down to the cervix is sewed to the fascia of the anterior vaginal wall. Thus the uterus is firmly fixed in anteverision to the fascia, the bladder resting on the posterior aspect of the body of the uterus.

In the series of 50 patients reported, the oldest patient was sixty-nine, the youngest, thirty. It was found necessary to repair or amputate the cervix in 41 cases and Crossen's or Bandler's operation for relaxed pelvic outlet and rectocele was done in 45 cases. The mortality was nil.

To the follow-up questionnaires 32 patients replied. It appeared that 27 out of the 32 had been wholly relieved of the troubles complained of at the time of operations; there had been no falling down of the parts and there had been improvement in general health. Two got partial relief. There was a total failure in 3 cases. These were cases of enteroceles that had been overlooked on account of the large rectoceles.

Urinary pathology should be cleared up before operations. A diet that produces no accumulation of feces in the rectum should be given for seven days. Bowels are not emptied for the first seven days so that contamination of the perineal sutures may be prevented.

WM. C. HENSKE.

Recasens, Luis: Method of Thorning for Treatment of Prolapse of the Uterus. *Revista Espanola de Obstetricia y Ginecologia*, 1925, vii, 281.

No operation yet described is satisfactory for curing prolapse of the uterus, and permitting future pregnancies and labors without almost inevitable recurrence of the condition for which operation was originally done.

The operation of Thorning described below has been done by the author in eight cases, with good immediate results. If done at or after the menopause it is most satisfactory, in that artificial sterilization is not necessary. The steps are as follows: 1. Pfannenstiel incision, transverse incision of fascia, retraction of recti, vertical incision through peritoneum. 2. Suture of round ligaments to parietal peritoneum by continuous suture, beginning at outer end on one side, across face of uterus, and continuing to the entrance of the other ligament into inguinal canal. (This avoids possibility of strangulation of the gut.) 3. Sterilization, if necessary, by means of excision of 1 to 2 cm. of each tube by thermocautery. (Thorning implants infundibulum of tube into anterior leaf of broad ligament for future "undoing" if occasion arises.) 4. Suture of peritoneum from above downward to posterior surface of fundus, also of recti to same point. 5. A tongue of fascia is cut from the upper edge in midline, two to two and a half cm. long and one to one and a half cm. broad, to be carried through a corresponding slit cut through the top of the fundus, and the corresponding edge of the fascia below. 6. Suture of remaining fascia and skin.

This method brings the fundus uteri extraperitoneal and secures a firm fixation. Any other required plastic operation on the cervix, vagina or perineum may be done before laparotomy.

THOS. R. GOETHALS.

Markow, N: Fixation of Uterus in Case of Prolapse. *Russian Clinic*, 1925, iii, 619.

The writer proposes the following modification of the Goebell-Stoeckel operation for cases of marked prolapse: A flap is dissected off alongside the abdominal incision, comprising both aponeurosis and muscle. The flap is split lengthwise, crossed at the symphysis and then on either side of the incision, one-half of it passed through aponeurosis, muscle and peritoneum, furthermore through broad ligament underneath ligamentum ovaricum, and after one more crossing is fastened to the posterior surface of the uterus. As a routine a perineal plastic is added. The fascial strips should hold the uterus firmly against the symphysis.

AUTHOR'S ABSTRACT.

Dujarier and Larget: Operative Technic of Total Colpectomy in Prolapse of Old Women. *Journal de Chirurgie*, 1925, xxv, 283.

Total colpectomy or Müller's operation is intended to cure complete prolapse in women past the menopause and where coitus is no longer desired. The technic as practiced by Dujarier and Larget is as follows:

Preoperative Preparation.—In complete prolapse the common traumatic ulcerations of the vaginal walls should be cleared up by cleansing douches and reduction of the prolapse by tamponade.

Anesthesia.—Spinal anesthesia is the procedure of choice, those authors using 6 to 8 eg. of novocaine intraspinally.

Operation.—The cervix is grasped with a tenaculum and outward traction is exerted. An incision through the vaginal mucosa is made completely around the vagina, just below the external urethral meatus and within the posterior fourchette. Two incisions, one anterior and one posterior and at right angles to the first incision are next made, and the entire vaginal wall is dissected downward to the cervix in two lateral flaps. These flaps are next cut from the cervix so that practically all of the vaginal mucosa has been removed. The cervix is then split and amputated at the desired height. All bleeding points are ligated, the remaining portion of the cervix is sutured by interrupted catgut sutures, and a small drain is left in place. The denuded anterior and posterior vaginal walls are next brought together by several layers of interrupted catgut sutures beginning at the cervix and working outward in such a way that each layer of sutures raises the uterus higher into the pelvic cavity. Finally the remaining ring of vaginal membrane is sutured anteroposteriorly.

Postoperative Treatment.—The vulva should be washed with sterile water twice a day. Catheterization is advisable for the first forty-eight hours to prevent contamination. The drain is removed between the tenth and twelfth day and the patient may sit up on the fifteenth day after operation.

Dujarier and Larget have performed this operation fifteen times. With the exception of one case, which was not drained and in which there developed an infected hematoma, the results have been excellent. Examining these patients two years after operation one finds the vagina replaced by a firm fibrous cord, which in all cases has proved to be of sufficient strength to withstand the intraabdominal pressure.

THEODORE W. ADAMS.

Roberts, C. S. Lane: Acute Puerperal Inversion of the Uterus. *British Medical Journal*, 1923, i, 557.

Two cases of puerperal inversion are recorded.

In the first case the outcome would certainly have been fatal had it not been possible to do immediate blood transfusion. The patient was deeply shocked and attempts at replacement of the uterus apparently only deepened the shock. The ideal treatment would appear to be immediate blood transfusion with later replacement of the uterus. If blood is not available it would be worth while to try gum acacia solution, but saline seems useless if not harmful in certain cases.

The second case falls more into line with the series published in 1920 by Dr. Spencer. The patient got up on the tenth day and seemed quite well till the sixteenth day, when during the act of defecation, she felt her womb drop; the attending physician made a diagnosis of uterine inversion.

F. L. ADAIR.

Kundu, Rajendra Nath.: Spontaneous Inversion of the Uterus. *Caleutta Medical Journal*, 1925, xx, 20.

Patient, twenty years of age, gravida ii, had a precipitate labor with a spontaneous inversion of the uterus after a little over one hour in labor. She was cold, clammy, and showed a feeble, rapid pulse. Routine method of replacement failed under anesthetic. Finally, the uterus was replaced by steady pressure with a suitable pad of gauze against the fundus. The fingers were used as a cone after the uterus started to move upwards. A hot intrauterine douche was given for ten min-

utes and the uterus plugged. Ergotine and morphine were given and the next day 20 c.c. of antistreptococcic serum was injected. The patient made an uneventful recovery. In this case the cord was not short nor the uterus in an atonic state; the author believes the inversion was due to the precipitate labor and the violent contraction of the uterus.

ADAIR AND HACKETT.

Kamberg and Bol: A Case of Inversion of the Uterus with Recurrence on the Tenth Day. Nederlandse Tijdschrift voor Geneeskunde, 1925, i, 2141.

These authors review the incidence, possible causes, and treatment of uterine inversion and append the following case history.

A tedious labor in a twenty-two-year-old primipara was terminated by a low forceps application. The child weighed 4000 gm. While the attention of the attendant was concentrated on the child, the mother suddenly bore down and expelled the placenta. At the same time she flowed freely, became pale, and perspired freely. On examining the placenta, it was found to be adherent to the inverted uterus from which it was easily detached. The uterus was readily replaced. Bleeding was free, but was completely controlled by pituitrin and ergot. Convalescence was afebrile but the patient had difficulty in voiding urine. Ten days postpartum the patient strained in an effort to empty an overdistended bladder after which she again began to flow and to show evidence of shock. The fundus was found in the vagina inverted in the shape of a globular tumor. Under ether narcosis a remaining lobe of placenta was removed and reposition of the fundus made. During the next few days she had some fever but made a good recovery. In order to prevent recurrence of the inversion, a wide-mouth bottle was held in the vagina by means of tampon and perineal binder in such a way that the cervix was in the neck of the bottle.

The authors believe that inversion of moderate degree may at times be overlooked and they emphasize the fact that even careful examination of the placenta may not always guarantee against the retention of a lobe.

R. E. WOBUS.

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